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A Narrative Study of Girls of Mexican Origin**

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**SHAPING IDENTITIES IN SCHOOL SCIENCE:
A NARRATIVE STUDY OF GIRLS OF MEXICAN ORIGIN**

By

Constanza Chiappe Hazelwood

Volume I

A DISSERTATION

**Submitted to
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ABSTRACT

SHAPING IDENTITIES IN SCHOOL SCIENCE: A NARRATIVE STUDY OF GIRLS OF MEXICAN ORIGIN

By

Constanza Chiappe Hazelwood

This dissertation is a narrative study about the social identities of adolescent girls of Mexican origin and the meaning of science in their lives. All seven participants in this study were enrolled in middle and high school institutions. Although there is a fairly substantial corpus of work pertaining to minority and girls' participation in science, there is a paucity of research in science education that examines identities as a focus of study.

To learn about the meaning of science in the lives of girls of Mexican origin I begin by asking who are these "Hispanic," "Latinas," "Mexicans," "Chicanas" commonly grouped under the categories of "girls and minorities," whose identities characterize marginality in science? By analyzing participants' narratives in conversations, interviews, and journals, I at once explore and propose a politics of inclusion in science which focuses on identities, rather than in depth examinations of subject matter content.

Findings stemming out of this study raise issues of difference within a group of girls with a common Mexican origin, however dissimilar the dimensions of their social identities such as social class, academic achievement, religious affiliation, and ethnic identity. This study grew from the feminist premise of placing girls and women at the center of research studies; however, it goes beyond notions of inclusion in science which

Constanza Chiappe Hazelwood

emphasize gender as an overriding dimension of identity that explains students' responses to schooling. The collection of narratives in this study lead us to reflect upon responses to schooling in light of historical and cultural roots which render a picture of social identities as multi-dimensional.

Rather than focusing on personal attributes or deficiencies characteristic of people belonging to minority groups, this dissertation focuses on social structure constraints as well as the exploration of possibilities towards the goal of social change. It is my hope that this study encourages teachers and researchers to ask the kinds of questions I asked from the participants in this research, to gain in depth understandings of the structural forces that shape our lives.

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ACKNOWLEDGMENTS

This dissertation has grown from a collaborative effort to tell stories, share experiences and voice concerns regarding the education of young adolescent girls of Mexican descent. I am grateful to the girls whose stories were shared openly and intently to make important contributions to the field of science education. Although I can not acknowledge their names individually in the interest of confidentiality, I would like to recognize them collectively and extend my gratitude to their families for their generosity, their support, and the impact they have had on my life.

Likewise, I would like to acknowledge the support given by the school district which facilitated contact with students, provided access to classrooms and provided sites for our weekly meetings. This work would not have been possible without the help of teachers, principals, and parents whose interest in issues regarding the education of Mexican students was always a source of inspiration and support.

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appreciation of the contributions of my work for teachers and administrators. My special thanks to Kathleen Roth, my indefatigable dissertation director for her unconditional support, encouragement and invaluable guidance. Through her work at Michigan State University, Kathleen Roth has brought together a group of graduate students and faculty known as the Women in Science Education (WISE) who challenge traditional approaches to science and work towards a re-conceptualization of school science. To all the WISE members I am indebted for a unique opportunity to be a part of an intellectual climate where my ideas were allowed to grow and bear fruit. My special thanks to Lynnette Cavazos whose work with science teachers opened up uncharted territory and marked a pathway for those of us who followed her. To Angela Barton, a friend and intellectual companion whose serious commitment to critical liberatory pedagogy in science has always been inspiring. Thanks to Elaine Howes and Lori Kurth for their appreciation of my writing style and their encouragement to continue telling stories.

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developed artistic sensibility which inspired me to conceive this dissertation as a carefully crafted work of art, as much as an academic composition. To all my special thanks.

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Chapter 1

INTRODUCTION

*I am proud, proud of my culture and my race.
I am very involved in things. I like to participate in things especially things that
have to do with my culture...*

Dominic (Interview-8.24.93)

"Face" is the surface of the body that is the most noticeably inscribed by social structures, marked with instructions on how to be *mujer*, *macho*, working class, Chicana. As *mestizas*---biologically and/or culturally mixed---we have different surfaces for each aspect of identity, each inscribed by a particular subculture. We are "written" all over, or should I say, carved and tattooed with the sharp needles of experience.

Gloria Anzaldúa (1990, p. xv)

I know where I came from. I know that I'm Mexican and I'm proud of it. My parents when they started out were just migrant workers and I'm proud of them because if my parents hadn't tried so hard, I would probably be in the fields right now, and I wouldn't even be here.

Alejandra (Conversation-9.24.93)

To tell a story, or to hear a story told, is not a simple transmission of information. Something else in the telling is given too, so that, once hearing, what one has heard becomes part of oneself.

Susan Griffin (1993, p. 154)

I want to be somebody. I want to be recognized. Really be on the top. I want to have a good education. I know I'm smart.

Victoria (Interview-8.24.93)

I could've been somebody, you know? My mother says and sighs...Shame is a bad thing, you know It keeps you down. You want to know why I quit school? Because I didn't have nice clothes. No clothes, but I had brains. Yup, she says disgusted, stirring again. I was a smart cookie then.

Sandra Cisneros (1989, p. 90)

Do you hear voices in the words that open this dissertation study? Do these authors speak to you, as they talk to me about who they are and how their multiple identities shape the ways they relate to the world? What do their words say about schools, and the meaning of education in their lives? Most importantly, are you willing to let these words transform you? Listening, transcribing and reflecting on the words of adolescent middle school girls of Mexican¹ descent has been the motivation of my work for the past two years. These girls' voices spoke to me about culture and pride, history and social location. They talked about being smart and becoming somebody, they spoke about faith in getting a good education.

These girls' voices are not alone. Their themes of cultural and racial pride, their historical roots, their traditions and sense of becoming somebody are echoed in the pages of feminist and Chicano literature where I have found enlightening resources that taught me to listen carefully to their voices. I listened to give meaning to their stories, as Susan Griffin reminds me, to let their stories transform me, to make them a part of myself. I listened to challenge these girls' invisibility in classrooms where teachers describe the world without them. I listened to the ways their voices resonate in schools around the nation where students place their hopes for a better future in the hands of those in charge of their education.

I also listened to these girls' voices against the backdrop of the texts in my professional field, science education, where girls of Mexican descent appear lumped under one category of "minorities," or "girls;" sometimes as "Hispanics," or "Chicanos," at once present and invisible in educational discourses. Adolescent girls of Mexican origin are

¹ My use of the terms Chicana, Mexicana and Latina is informed by the participants' use of these terms. Mexicano/a refers to people of Mexican origin born either in the United States or Mexico. Although this was not the preferred term for each participant, it was one they all used to refer to their ethnic identity, regardless of their place of birth. I use the term Chicana throughout the text to refer specifically to those girls of Mexican origin born in the United States, who expressed political awareness of their ethnic location and claimed the label Chicana to identify themselves. I use the term Latina as a generic label to include myself in the same ethnic group as the rest of the participants. As the reader will see throughout this dissertation, these distinctions present interesting conflicts, contradictions, they raise points for reflection and highlight the enormous diversity hidden under the disguise of common labels.

recognized in science education discourses to the extent that fragments of their identity have become a current issue for political debate. The presence of girls of Mexican descent in educational discourses is almost invariably linked to their absence in the field of science. This absence in the field of science, coupled with a picture of risk, poverty and failure characterizing minority populations in the U.S., and a growing concern for the demographic changes often described as the "browning" of America, present a scenario in need of further exploration.

Current reforms in science education that attempt to correct the historical trend of by-passing certain segments of the American population in science and technology, for example, address issues like the under-representation of some minority groups in scientific fields (National Education Goals Panel, 1995) and the growing gap in academic achievement between white students and their Black and Hispanic counterparts (Jones, et al., 1990). These are only a few reported indicators of the U.S. educational system's failure to educate all students. In its report *Science for All Americans: Project 2061*, The American Association for the Advancement of Science (AAAS) issued a set of recommendations that intend to make science accessible to all students (AAAS, 1989). These recommendations, the report claims, "pertain to those who in the past have largely been bypassed in science and mathematics education: ethnic and language minorities and girls." (p. 20). Informed by these initiatives, states around the nation are calling for re-examination of current practices in science teaching and re-formulation of curricular frameworks. New frameworks in the state of Michigan, for instance, are committed since the beginning of this decade to the "development of programs that serve all students by emphasizing knowledge that is useful to all, and by providing information about how people of all races and cultures have contributed to science" (Michigan Department of Education, 1991, p. 3).

There are also multiple discourses in educational reform pertaining to the experiences of girls. The American Association of University Women's (AAUW) report

How Schools Shortchange Girls (1992), claims that "There is clear evidence that the educational system is not meeting girls' needs" (p. 2) and calls for "renewed efforts on behalf of our nation's schools" (p. 17). Particularly in the field of physical science, these researchers have found a persistent "gender gap," which raises a number of questions regarding the schooling process whereby girls begin school at roughly equal levels of ability and even ahead of boys, at least on some measurements of readiness, and twelve years later are falling behind. Even when they do well in math and science, girls tend to dismiss these areas as possible higher education opportunities, and they need encouragement from teachers to pursue scientific and technological careers (AAUW, 1992).

It is under these broad categories of "ethnic and language minorities" and "girls," that the participants in this study are represented in the literature on science education. Recognition of difference along the lines of gender, ethnicity and racial characteristics presents an interesting paradox. While these broad labels recognize difference across groups, they render the richness of varied identities and experiences invisible. Through the processes of social categorization and social comparison discourses in science education define marginality, describe and explain academic success and failure, and formulate policies to correct current trends. Through these processes of categorization and comparison, educational discourses contribute to the shaping individuals' social identities.²

When social identities become a focus of educational policy and reform, several questions become relevant. How are identities conceptualized in these discourses? Which identities are recognized and which left out? When and why are they highlighted? What mechanisms are used to mark identities? How does the notion of difference inform the

² I use the notion of social identity that informs the work of Aída Hurtado and collaborators (1994) on social identification and the academic achievement of Chicano students. Hurtado's work is based on Tajfel's (1974) social identity theory which bridges individual's self concepts, social membership and the psychological significance attached to group memberships. Social identity is defined as "that part of an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the emotional significance attached to that membership." (Tajfel, 1974, p. 64, as cited in Hurtado, 1994).

process of democratization in schools? In particular, when it concerns the field of science education, one question rises over the others, why do identities matter in science education?

Science educational research and reports on the state of science education draw attention to differential student outcomes and differential access to opportunities across the lines of race, ethnicity and gender; however, these discourses fail to challenge representations of science as objective and disconnected from the subjects who study science. This subject/object dichotomy suggests that an individual's encounters with science should be free from identity claims and constrained only by empirical evidence. In science education, discourses that call for recognition of students' identities run against those that promote a universal notion of science that transcends any boundaries of race, class, ethnicity, and gender.

Why should identity claims become central in science education? I rescue a democratic argument from the pages of John Dewey's (1916) *Democracy and Education* to explore notions of social identities in science education and build upon them our democratic educational goals. Dewey says:

The extension in space of the number of individuals who participate in an interest so that each has to refer his own action to that of others, and to consider the action of others to give point and direction to his own, is equivalent to the breaking down of those barriers of class, race and national territory which kept men from perceiving the full import of their activity. (Dewey, 1916, p. 87)

In this argument, Dewey calls for democratic spaces in classrooms where class, race and national territory are not ignored, but rather recognized as barriers that need to be broken down. In a democracy, teachers have the moral imperative of extending the classroom, those spaces for "free intercourse and communication of experience" (*ibid.*, p. 99), so each individual's interest becomes communitary and the interests of the community, in turn, become individual. An understanding of the processes that link individuals to social groups and the emotional attachments that result from this membership is necessary for a free interchange and communication of experience.

Dewey's vision of education located individual experience at the center of educational endeavors. It connected knowledge to activities and occupations, to individuals and identities. This connection found theoretical support in logical systems such as the ones developing in experimental sciences at the turn of the century:

...since democracy stands in principle for free interchange, for social continuity, it must develop a theory of knowledge which sees in knowledge the method by which one experience is made available in giving direction and meaning to another. The recent advances in physiology, biology and the logic of the experimental sciences supply the specific intellectual instrumentalities demanded to work out and formulate such a theory. Their educational equivalent is the connection of the acquisition of knowledge in the schools with activities, or occupations, carried on in a medium of associated life. (Dewey, 1916, p. 344-345)

I read Dewey's words as a reminder of the central place of an individual's experiences--inside and outside school settings--and the centrality of individuals' social identities in the processes of knowledge acquisition, and also in the strengthening of democratic principles. Ideally, the experimental sciences would offer a logical system that honors the presence of individuals' experiences and consequently, gives science teachers a considerable advantage over teachers in other disciplines to create democratic spaces in schools. However, as national and statewide initiatives to improve science education in the 90s remind us, this goal has not been attained over the course of this century. Today, reform efforts in science education urge educators, administrators, and school teachers to embrace the unattained goal of achieving scientific literacy for **all** students.

Given a common goal of promoting the democratic principles of free interchange and social continuity in the science classroom, we need to ask: Who are the marginal people in science classrooms? Have they constructed any kind of relation to science, and if so, how is this constructed? What is the meaning of science in their lives?

These questions assume a notion of identity to define marginality and inclusion in science. In this dissertation, I focused on notions of identity as a point of departure for the examination of the place of science in students' lives. Rather than assuming that people categorized together as "minorities" and "girls" need to move towards science, I propose that we find a place for science in their lives. This approach shifts the traditional paradigm

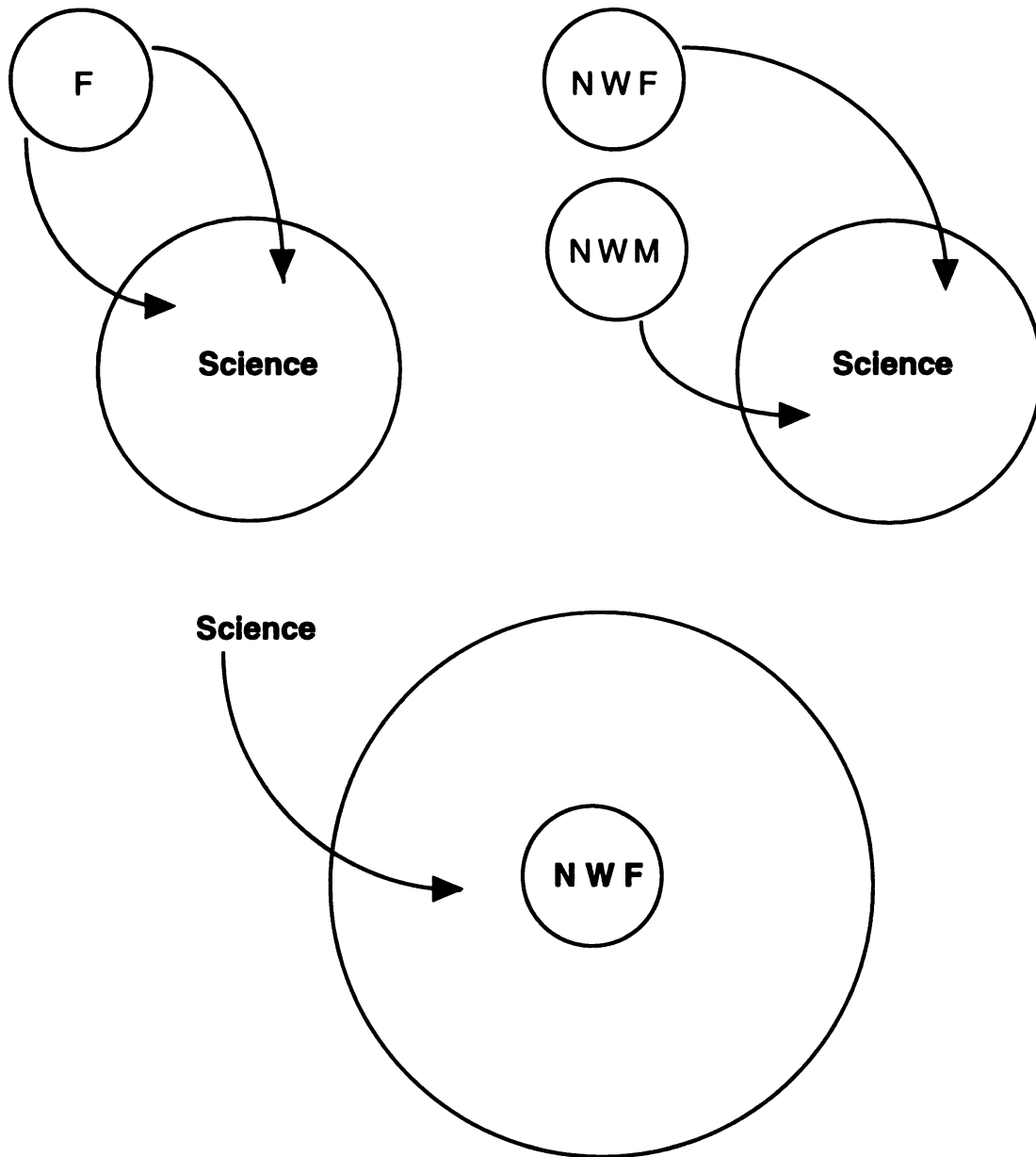
where science lies at the center, as a target to be reached by students who have been located by virtue of their social identities, at the margins. By contrast, I propose an approach to inclusion where students' identities remain a central focus that guides our pedagogical democratic principles, and science is transformed to become part of their lives. *Figure 1* is a graphic representation of this shift from placing science at the center of our notions of marginality and inclusion towards a displacement of science from the center of inquiry in science education and the center of pedagogical conceptions of science.

The practice of doing research guided by the participants' voices has enlightened my understanding of the central place of identities in narratives of experience, and the marginal place of science in the participants' lives. At the outset, I focused this dissertation study around the question of participation in school science: How do Latinas view their participation in school science? This guiding question led me to an exploration of the meaning of social identities and the meaning of science constructed by adolescent girls of Mexican descent in narratives of experience. To learn more about girls' relations to science, I asked, Who are these girls? What is the meaning of science in these girls' lives? How do they experience science? What is the relationship between science, experience, and identities?

Through their narratives of lived experience, both in structured and unstructured conversations and interviews, the participants in this study gave me access to ways they connected to science. Often these connections were feeble, sometimes undesirable and occasionally exciting and challenging. In their voices, these girls talked about their conceptualization of science as body of knowledge, as an activity, as a grade, as work to get done, as a place for participation in the act of knowing and as a site for political action. All girls were currently taking science as a required subject in middle school, and some had

Figure 1

**Towards Placing Social Identities at the
Center of Inquiry and Practice in Science Education**



Symbols

F -	Females
NWF -	Non-White Females
NWM -	Non-White Males

been introduced to science since elementary school. The meaning of science in Mexican girls' lives is a topic of special interest that connects different, yet related bodies of literature concerning research on girls, minorities, and science. The multiple meanings of science in these girls' lives bring to the foreground the central role of their multiple identities in their encounters with subject matter.

I do not intend in these pages to provide a complete characterization of girls of Mexican descent, a project that would inevitably lead to stereotyping conceptions and oversimplifications of rich and varied forms of cultural heritage. Nor do I intend to formulate a neatly packaged list of procedures to engage girls who identify themselves as Mexicans or Chicanas in the process of schooling and in science. Through the stories of experience that make up this study, participants brought into their narratives notions of identity that are not in competition with each other. They portrayed themselves as friends, grandchildren, daughters and sisters, as students and learners, smart and diligent, *quinceañeras*,³ girls, and ladies. They talked about themselves as Americans and Mexicans, Chicanas, Latinas and Hispanics; as minorities and majority. Reducing the richness of their stories to a hierarchy of identity labels would only distort complexity for the sake of apparent order and simplification. Throughout this dissertation my goal is to lay out roads to explore this complexity, to highlight the importance of social identities in their multiple dimensions, and to draw our attention to identities as central foci in our educational endeavors.

Much is to be learned about the ways identities and science intersect and shape each other in classroom spaces where science is taught. I placed the spotlight on seven Mexican girls, not because they represent a group that is totally absent in discourses on science education; nor am I claiming that these girls have no connection to science. Rather I am bringing their stories to your attention to take another look at the assumption that they are

³ Quinceañera is a term that denotes age, gender and language affiliation. It refers to a girl's fifteenth birthday. Some families celebrate this event as a rite of passage from childhood to adolescence.

marginal to science. It is my hope that an attempt to understand their identities and an intended effort to hear strength and hope in their unique voices will reveal a range of possibilities for finding a relevant place for science in their lives.

Dissertation Outline

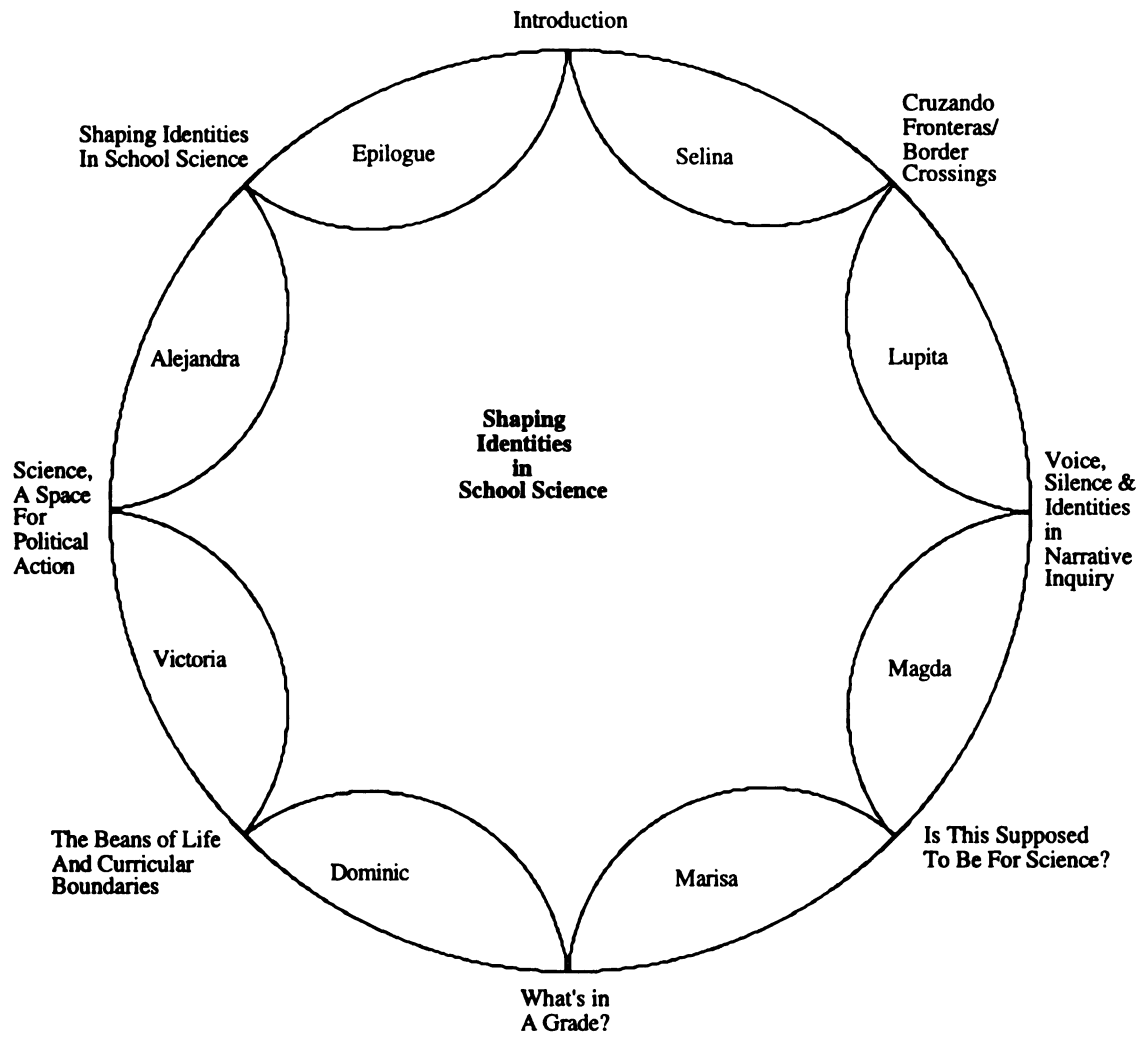
This dissertation is divided into seven chapters woven together by a thread of seven portraits that introduce the reader to the participants in our conversation group. To escape the linearity of paper, *Figure 2* better represents the interwoven structure of the chapters and portraits, while it also leads the narrative back to the initial issues raised in this introduction. My purpose is twofold. While I hope to provide the reader with a sense of the different challenges facing each one of the girls participating in this study as they shape their identities in the context of schools, I also want to give a sense of continuity across the chapters and portraits. Therefore, while I stress difference and diversity in the participants' narratives, I use the chapters to highlight common themes that cut across narratives.

To locate this study within a historical context, I begin the series of portraits with *Selina: Portrait One*, and a brief overview of the history of Mexican settlers in Cedarville. Selina's is a portrait of a middle school girl with career expectations, who excels in school, and struggles to shape a different identity than her mother's.

In Chapter 2, *Cruzando Fronteras/Border Crossings*, is a brief exploration of the conceptual frameworks that inform this study. In this chapter I explore the notion of border identities, a metaphor that encompasses two related experiences, one the act of crossing geographical boundaries to become an immigrant in a foreign land, and the other is the process of crossing the boundaries of science to become an equal partner in this enterprise.

In *Lupita: Portrait Two*, I highlight different challenges facing those who attempt border crossings. While this portrait intends to present an image of Lupita as a person who is shaping her identity within a system of intermeshed oppressive sexist and racist forces, living at the borders between childhood and womanhood, between White and woman of

Figure 2

Table of Contents: A Circular Representation

color, the portrait also raises methodological issues and illustrates the ways I used diverse data sources to listen and make sense of Lupita's multiple voices.

Chapter 3, Voice, Silence and Self in Narrative Inquiry is an overview of the methodological foundations that inform this research study and the methods used in this process of doing narrative inquiry. This chapter is followed by *Magda: Portrait Three*, a portrait where I analyze the challenge of silence, a paradox for a researcher attempting to create a space for voice in this dissertation. As a recent immigrant, Magda, a middle school student, raised for me a number of issues related to assimilation in school settings.

Chapter 4, Is This Supposed to Be For Science?, is about the place for science in our weekly conversations. In this chapter I analyze the process of having conversations with the research participants and I explore the connections between identities and the thematic pattern of science in our conversations.

Marisa: Portrait Four, is about a middle school girl whose lived experiences have been shaped by the constraints of low socio-economic status and her parents' limited schooling. Marisa's voice is interwoven into Chapters 5 and 6, where she talks about representations of science as a grade, and science as "everything."

In *Chapter 5, What's in a Grade*, I analyze the notion of grades as representations of science and self. Drawing from conversation excerpts, I explore the ways participants' social locations shape the meaning of science as represented by grades. The theme of grades leads into *Dominic: Portrait Five*, which depicts Dominic's challenge of sustaining self-pride in spite of the forces of sexism and racism marked in her narratives about life in high school and in her talk about prospects for future opportunities.

In Chapter 6, *The Beans of Life and Curricular Boundaries*, I focus on a key conversation which became an important point of reference from which I began to listen to possibilities of connection to science from the standpoint of the participants in this study. This conversation generated possible strategies to engage in critical analysis about the

meaning of science in students' lives, and foster connections between science and students' historical roots.

Victoria: Portrait Six, is perhaps the most intriguing for those readers who are especially interested in girls who want to pursue science as a career opportunity. Throughout her narratives Victoria, a middle school student, speaks about the challenges of breaking away from traditional women's roles and distancing herself from a collective Mexican identity.

Chapter 7, Science As a Site for Political Struggle brings together a collection of narratives where girls speak about the struggles they face in the enactment of the science curriculum in classroom settings. In their narratives, the participants raised a number of issues concerning their agenda of shaping identities in classroom settings.

Alejandra: Portrait Seven, weaves together the different challenges illustrated in the previous portraits and frames the responses to the participants' struggles within a politics of resistance of a chicana, with sophisticated levels of awareness and immense manifest pride/high school in her cultural heritage.

In *Chapter 8, Shaping Identities in School Science*, I reflect upon the impact of listening to girls' voices in narrative as a methodological approach to science that acknowledges the multiplicity of voices embodied in one person. In this chapter I bring together two themes emerging from this dissertation work. First, I highlight the notion of diversity in regards to the multiple social identities that shape the ways adolescent girls of Mexican descent connect to science. Second, I draw from this dissertation findings to endorse and at once explore the challenge of placing identities at the center of pedagogical endeavors in the practices of doing research, designing educational policy, and teaching science. This chapter is followed by an *Epilogue*, a personal narrative where I bring together the most revealing and powerful findings that have transformed my own sense of identities in my multiple roles of teaching, parenting, and educating.

SELINA: PORTRAIT ONE

"My mom...she doesn't want me to be like her"

Driving the main artery of the city of Cedarville,¹ one encounters block upon block of modest, non-descript housing that could be the working class neighborhood of almost any medium-size city in the Midwest, until one catches a glimpse of a garish sombrero announcing the entrance to "the best comida Mejicana in town--Don Pepe's." Small Latino grocery stores and bakeries quite literally fill the air with the pungent smells reminiscent of a barrio "south of the Border." Selina's tidy house sits at the edge of this neighborhood, one that has seen hundreds of former migrants settle near the old sugar refinery in what has become an enclave of homes, churches, community centers, and businesses primarily attending to Mexican families in the area.²

Upon my arrival to Selina's house, I was warmly greeted by her grandmother, Señora Sánchez, a vibrant woman dressed in a brilliant mustard colored suit adorned with an elegant string of beads carefully arranged around her neck. One of the first Mexican settlers in the area, this strong-willed matriarch had recently received the attention of our local newspaper which described her as a determined, self educated mother of 15 children. Early in her teens, in 1938, the newspaper reported, Señora Sánchez moved from Texas to "El Norte" with the wave of thousands of other Texan families looking for work (Cedarville Journal, 1992).³ The demand for *betabaleros*, beet workers, attracted many to the area of Cedarville, where sugar beet farming was in a tremendous growth stage.⁴ Looking back, fifty-four years later, Señora Sánchez declared, "One of my dreams was my kids weren't going to work in the fields."

As I waited in the living room for Selina to appear for her interview, Señora Sánchez apologized repeatedly for Selina's slow response to her boisterous, authoritative call to come downstairs, and she informed me of her whereabouts. She was waiting for her ride to take her to a community meeting, a fund-raiser where she would be meeting with doctors from the area. As Señora Sánchez moved quickly around the living room she showed the fast paced step of a much younger spirit than the 66 years of life reported in our local newspaper.

The whirlwind of activity that represented Señora Sánchez's life was clearly visible in her crowded living room, where every corner displayed dozens of objects, big and small, each eager to tell a story. Figurines, pictures, religious artifacts all

¹The city, school district, individual schools, and all the participants are identified by pseudonyms.

² This area of Cedarville dates back to the post World War II period. Its Mexican settlers, former migrants, dropped out of the migrant stream and moved into jobs in diverse unskilled occupations ranging from industry, service and agriculture.

³ To protect the identity of the participants I used pseudonyms to reference this journal.

⁴ Immigration was boosted during the early 40s by the Emergency Farm Labor Supply Program enacted in 1942. This law permitted the formal contracting of Mexican laborers on a season basis for U.S. farmwork. Despite mechanization of sugar beet production, and the loss of one of the major sources of employment in the Cedarville area, immigration grew again by the "bracero" program in the 50s which drew laborers to the pickling cucumber industry and work in crops like onions, mint, lettuce, and celery. Since 1964 most seasonal farm work in the state has been performed by Chicanos, but the later introduction of pickle harvesters and cherry shakers have forced migrant families to search for other forms of employment (Haney, 1979).

shared the same space with a TV set and amiably uncoordinated living room furniture. Images of the 15 sons and daughters, nephews, nieces and 33 grandchildren who make up the family were proudly and carefully displayed, taking up nearly every available spare bit of shelf and wall space. Tiny trolls stood side by side of the Virgen de Guadalupe; a picture of Cesar Chávez the well known Mexican farmer union leader, stood on the floor by an oversize Big Bird chair. As my eyes scanned the room I longed for the power to animate these objects, crammed into this tiny, overcrowded space, to make them talk to each other--to hear their individual parts in this fascinating story.

Rising above everything else, as if guarding the whole scene, a familiar, dark-skinned statue grabbed my attention. I recognized the image of Fray Martín de Porres, a Peruvian priest who has many devoted followers in my country. Just a glance was enough to take me thousands of miles away, back to my own grandmother's bedroom, where as a child I was initiated into the knowledge of saints for every possible malady and disease.

The nostalgic reflections of my grandmother's spiritual favors granted by Fray Martin were abruptly cut short by Señora Sánchez as she leaned forward to turn off the TV and its typically overly dramatic images of a lover's quarrel of a preferred soap opera. As if she had read my mind and recognized my interest in our common religious upbringing, she broke away from the intrusive presence of commercial television.

I felt comfortable knowing that in spite of the time and distance that separated our respective childhoods, we still had much in common as we reminisced about our Catholic roots in front of Fray Martin and the Virgen de Guadalupe. This almost spiritual moment seemed appropriate as background to get to know Selina, who suddenly came rushing down the stairs to meet me.

Selina was a very different girl than the casual, sweatshirt-clad teenager I had met a few days earlier. The sudden visit I had made to her house when we first met through a common acquaintance did not give her sufficient time to attend to her physical appearance. For today's visit, she had carefully arranged every piece of clothing with special care to her long shiny black strings of hair hanging on one side and the frizzled bangs that lined her upper front. Our first visit had been monitored by Selina's grandmother, who expressed interest (more likely mild concern) in meeting me before Selina committed to this research project. The presence of Selina's grandmother on our first encounter marked the imprint of strength that emerged from a woman who taught herself to read and write in two languages and supported her 15 children towards the completion of high school. Her commitment to the education of the entire clan was revealed to me when she opened a carefully stored envelope she kept in the dining room cabinet. Here were collected Selina's honorary diplomas, report cards and letters complementing the academic achievements of her granddaughter. Señora Sánchez's overt, passionate pride in these scholastic documents on display confirmed the perception that her granddaughter was living to her expectations of excellency by the academic standards of the school she attended.

Selina was thirteen years old when I met her. She was beginning eighth grade at Phillips Middle School ⁵ conveniently located within walking distance from her grandmother's house, where she lived with her mother, and a few other relatives. During school breaks, Selina also spent time with her father, a Cuban immigrant and longtime resident in the area.

From both sides of the family, I had learned about Selina's academic accomplishments. Her fame of being a good student spilled over into her school, where teachers and administrators eloquently praised her. When I asked her to describe herself Selina said, "I am a happy person, I'm always happy. And I'm nice and funny and... also a good student." However, unlike Señora Sánchez, Selina did not display her academic strengths confidently and received my compliments with a brief smile and an evasive look. When I asked her why she went to school, her answer pointed at reasons which in and of themselves did not account for her excellent academic reputation. She claimed that she went to school for two main reasons: one, because her mother made her do it; the other, her friends who made her want to do it.

Selina's mother expressed commitment and support for her daughter's education. This was common to all the mothers of the participants in this dissertation, but it was unique in the ways the message came across to Selina:

Constanza: Why do you want to do well in school?

Selina: Oh. My mom tells me because she doesn't want me to be like her, cause she had me at a young age, and she couldn't really go to school, so...she just, like, when /unintelligible/ when I was little, she was telling me like what, asking me what I always wanted to be, and all this, and I still wanted to be the same thing, 'cause it's like, I was five years old, and so, I guess it just got stuck in my head to do well and do good.

⁵ In 1994 Phillips Middle School reported a total population of 1042 students: American Indian 2%, Black 29%, Asian 6%, Hispanic 14%, White 49%; a male/female ratio among Hispanics of 68/83. The percentage of students with satisfactory scores on the MEAP test in 1993-1994 was: math 25.0, and science 41.8. The percentage of students whose financial resources made them eligible for free and reduced lunch was 64.5%.

Selina's appreciation of educational opportunities was rooted in her mother's experiences of denial of opportunities when she became a mother at an early age. The message that Selina's future would be different than her mother's was reinforced in her goals to become a professional dentist.

In my interviews with Selina, the question of ethnic identity brought to the foreground a set of interesting issues. Like most girls who participated in this study, Selina claimed Mexican as her ethnic identity, even though both she and her mother were born in the U.S.:

Constanza: ... When you talk about your background, what words do you use? Do you use 'Hispanic or...

Selina: Oh, I say Mexican.

Constanza: Mexican? Not Mexican-American?

Selina: No, just Mexican.

Constanza: What does 'Hispanic' mean to you?

Selina: Uhm. Hispanic means, like, the all of the Mexican-Americans, like, well, not exactly but, like Cubans are included and all that. And Puerto Ricans.

Constanza: Do you feel like a Hispanic, yourself?

Selina: Yeah.

Constanza: What about 'Chicano'? Does that say something to you?

Selina: No.

Constanza: Latina?

Selina: Yeah. I think, uhm, yeah, it does. I think it means same as Hispanic.

Perhaps because she lived with her mother, Selina seemed to find a stronger bond with her Mexican side of a family and not her ancestors on her father's side, whose background she tracked to Cuba and Spain. Even though the strength of her Mexican ancestry appeared in her alliances with friends and the foods she ate, Selina also recognized

her American roots in the soil where her ancestors once labored and later became permanent residents. She spoke to this issue:

- Constanza: Okay. Do you feel like you're more American than Mexican, or more Mexican than American?
- Selina: More American.
- Constanza: More American? Why?
- Selina: 'Cause. I've lived in Cedarville all my life and ...
- Constanza: Okay, you were telling me that you've been in Cedarville all your life, and that makes you feel like you're more American. Is there anything Mexican in you that you can really tell?
- Selina: No.
- Constanza: No?
- Selina: Like, how do you mean, that I can really tell?
- Constanza: Well, something that you feel that's really Mexican. Something you do, something you like.
- Selina: Oh, I hang around mostly Mexicans.
- Constanza: Uh-huh.
- Selina: I like the food.
- Constanza: Why do you hang around mostly Mexicans?
- Selina: I don't know. It's not that I chose to, but that's mostly who I hang out with. It just turned out that way.

Without deeper exploration, Selina believed her choice of Mexican friends was not deliberate. Apparently, she attributed to chance her alliance to other young people like herself, who claimed to be Mexican: "It just turned out that way."

When she spoke about her gender identity, Selina chose to label herself a "young lady," a person she contrasted with a "girl," someone with greater levels of responsibility and maturity:

- Constanza: Do you describe yourself as a girl or a woman?
- Selina: A lady.
- Constanza: A lady. And what is the difference?

- Selina: I don't know. I think that you have to be a little old to be a woman, so I'm kind of in-between. So I say young lady.
- Constanza: Young lady?
- Selina: Yeah.
- Constanza: When do you think you become a woman?
- Selina: Huh! I don't know. Uhm... um, I don't know. I really haven't thought about that.
- Constanza: That's a hard question, uh?
- Selina: Yeah.
- Constanza: ... Uhm, when did you stop being a girl? Or are you still...
- Selina: Well, I think that probably when I, a little after sixth grade, because I matured more. From being in middle school and all that.
- Constanza: So that, that's... a definite boundary, like, when you get into middle school, you stop being a girl?
- Selina: I think so.
- Constanza: And, why do you say sixth grade? What happened, what made you mature? What are some signs that you matured?
- Selina: Well, I had more responsibilities.
- Constanza: Like what?
- Selina: Like more school work and all that.

Not unlike her sense of connection to Mexican friends at school and her sense of self as an accomplished student, Selina's gender identity was also linked to school experiences. She described the passage from girl to young lady as an institutionalized progression from elementary grade school into middle school, whereby girls mature by acquiring more responsibilities associated with school work. Interestingly, Selina also held a common sense belief, that "girls mature faster than boys," one which does not fit under the developmental path provided by the institution of schooling where boys and girls are grouped by age. In their narratives about school, girls portrayed boys with their unmannerly ways of acting and disciplinary problems, who seemed to escape the process

of maturation provided by the school setting. The notion of differential maturity often served as an explanation to justify differences in behavior across the lines of gender.

As a future orthodontist, Selina was already seeing herself down the road as a professional woman. Apparently, the successful completion of a professional career seemed to lie in her hands, and she trusted that, as a minority, she would encounter additional opportunities to succeed in college:

Constanza: Do you think that as a Mexican you have special opportunities to become an orthodontist?

Selina: Yeah, 'cause I think that minorities get more of a chance when they're younger. Because so few of them have, like, went to college and all that.

Constanza: Uhm-hum. What about obstacles that get in the way because you're a Mexican?

Selina: I've never ran into any yet.

Constanza: Uhm-hum. What about being a woman? Do you think you have special opportunities? Or obstacles?

Selina: No.

Constanza: Neither one?... So as a woman, or a man, you think anyone can become an orthodontist?

Selina: Yeah.

Constanza: You would have the same opportunities? Or maybe the same obstacles?

Selina: Yeah.

Selina's positive outlook to the future marked a sharp contrast with messages she had received about various inequities concerning the educational and professional experiences of students of color and women. For instance, she agreed that most scientists are male, "but not all of them." As an explanation for the unequal representation of women among scientists, she declared:

"[Women]... become wives instead [of becoming scientists] and they, like, do the housework and all that instead."

This last assertion went by unchallenged, as an accepted truth which makes part of a pool of common sense knowledge. Interestingly, Selina's home life did not fit the pattern she described, where she was raised by her extended family and a working mother. But the assumption that women become wives and do the housework certainly reflected a way of life, a standard by which many women still are expected to enact their womanhood.

Selina expressed other inequities in her life in our conversations with students across Cedarville School District. But unlike the interview setting where I first met her, our conversation group was a space where Selina's assertions were discussed with other participants, giving way to comparisons and varied ways of gaining insights into the problem of inequities in school settings. A glimpse at one of our meetings [12.10.93] brings back Selina's voice, as she recalls messages she has received from one of her parents and reads them against the backdrop of her own personal experience and the stories shared by other adolescent girls of Mexican descent. In the following excerpt the reader will be introduced to Magda, Dominic, Marisa, and Lupita, four other Mexican girls who participated in our talk about girls in science. As you read, note how these girls delineate the borders of gender and race identities to provide explanations that describe and analyze their school experiences:

Constanza: I have a lot of things to...tell you about late news on how girls participate in science or not participate in science. Have you heard anything about national reports on that?

Magda: No.

Selina: My dad tells me about it.

Constanza: What does he say?

Selina: He just says that I should do well in science and math because, the, statistics or whatever say that girls don't do as good as boys.

Dominic: They're like, you can do better.

Constanza: Do you agree? That you can do better?

Marisa: I don't 'cause not all the time boys are all that perfect.

Constanza: Not all the time? Sometimes?

- Marisa: They may do a little more things than we can do. But...
- Constanza: Why do you think that statistics show that?
- Selina: Oh, and he said that it's mostly in minorities. That's all. I just had to add that little piece.
- Constanza: Ummm. So that minority girls are not doing as well as boys?
- Selina: Uhm-hum. Er, no. No wait, okay, it was, he tells me about boys, like, not minority just girls, but he was telling me like, they said that, White...people, they do better than minorities in science and math and /unintelligible/.

The characterization of minorities and girls as people who do not do as well as boys and Whites show how gender and racial markers in our conversation were used to describe a situation where educational outcomes in science are unequal. Interestingly, not all these girls seemed to share the same language to speak about issues concerning unequal educational outcomes, such as grades, as illustrated by Lupita's question:

- Constanza: Did you ask what is a minority, Lupita?
- Lupita: Yeah.
- Constanza: What is a minority?
- Dominic: Other than White.
- Constanza: Does that make sense Lupita?
- Lupita: Yeah. . .
- Constanza: Do you think that's true, that people coming from minority groups don't do as well?
- Selina: Yeah
- Lupita: Yeah.
- /?: I do.
- Selina: Cause, all the guys I like, hangout with, and girls you know that they're mostly minorities, but they like, have "I"s and all that on their report card, and the White people that I know, they have good grades and all that.
- Constanza: So, why is that? [Pause]. Is that a hard question?

The lumping of minorities under one broad category led Selina to make generalizations about the performance of non-White vs. White students, an assumption I did not question, but instead attempted to clarify. Dominic responded to my inquiries about the reason why Whites do better than non-White or minority students by making explicit two troublesome notions, one that Whites try harder, and the other, that school is geared to White kids:

Dominic: I don't think it's cause they're better. They just probably try harder.

Constanza: They try harder? Why?

Dominic: I don't know. I think that, a lot of stuff in school is geared towards White kids. They have the advantage, I think. I'm not trying to make an excuse, but, I think...

Constanza: It's geared to White?

Dominic: Yeah.

Constanza: Like what?

Dominic: I don't know, it's just that...I don't know.

Constanza: Do you think that science is geared to White kids?

Dominic: No, I just, I don't know.

The tone of Dominic's voice shed some doubts over her assertion that school is geared to White kids. Apparently, she could not point at specific examples to illustrate her point, or perhaps she hesitated to appear as someone who was trying to cover up or make an excuse for recognized under-achievement of students like herself. Selina, on the other hand, raised a clear affirmative statement when she asserted:

Selina: Yeah, cause on the TV, you mostly see guys, White guy scientists. They're all White and they're all guys.

Constanza: Ummm. Do you think that they're, misrepresenting science, or that in science you usually find White guys /unintelligible/ science.

Selina: Both.

The thread of gender as a marker of difference in the science classroom was brought up by Selina, as she connected the identity of her science teacher to the boys'

soccer coach and used these identities together to explain a differential pattern of interactions between the teacher and students of different gender:

Selina: Well, the teacher, my science teacher, he, he like, he's the soccer coach, and he'll, he'll like mostly call on, I don't think he means to, but he'll mostly call on the guys that play sports, so he can just talk about sports, cause that's all he does is talk about soccer and basketball and.../unintelligible/ and all this. I'm like, I don't care about that.

Constanza: That is really interesting. What do you do about that?

Selina: Nothing. Sometimes I make a comment, like I don't want to hear about this, really loud, just so he can hear me, but he don't pay no attention to me when I say it.

As these excerpts from our conversation illustrate, the girls in our group participated in school settings where their identities were shaped and, they were also contested. A common thread across the experiences shared by Selina and other girls who participated in this conversation group was the pervasiveness of practices that tend to construct marginal identities, rather than fully developed, self-confident individuals. Selina spoke about minorities and girls not doing as well as boys and Whites. She also acknowledged the unequal participation of boys and differential recognition of sports as an important part of her experienced science curriculum. Likewise, Dominic spoke about Whites, as opposed to minorities, trying harder and she also raised the issue of curriculum being geared towards White students. Like other students' stories of personal experience, Selina's narratives shared the awareness that the forces of racism and sexism operated in her classroom. The landscape of opportunities laid out by Selina when she spoke about her outlook on her future career as a minority woman orthodontist clashed strongly with her stories about schooling, where she was aware of many inequities prevailing across gender and racial borders. Neither her observations that her minority classmates had lower grades than her White acquaintances and that her science teacher called more on students who played sports, nor the lack of power she had to turn the situation around, present encouraging conditions for any girl, let alone a minority, to become a partner with equal opportunities to gain access to and construct knowledge in science.

Selina's portrait offers a space to bring to this dissertation a brief historical context for our conversations. I began by locating her household on a street with deep historical roots that link Selina to her origins in Texas and Mexico. Even though her family history is not identical to all the girls in this dissertation, the history of migrant farmers in the city of Cedarville has had an enormous impact on the shaping of each and all of our identities. Interestingly, after several generations born in the U.S., neither Selina's residential status, her bonds to America, nor her English proficiency have erased her Mexican heritage. This was a common story among us. We inhabited multiple identities. In some ways, Selina, like many of us, still lives at the border, where her Mexican and American identities co-exist, sometimes in harmony, but often in conflict with each other.

This portrait highlights the ways identities are shaped in educational settings. No longer a girl, but not yet a woman, Selina marked a gender border in her narratives as a process of maturation in connection to school work. She recognized herself as a young lady who learns that motherhood is a barrier that truncates her educational future. To become academically successful, Selina's pathway needs to be different than her mother's. In addition, Selina is aware of her affiliation with social groups that are distinctively disadvantaged and marginal in educational settings. Compared to Whites, minorities do not do as well in schools. Compared to boys, girls do not do as well in Mathematics and Science and they are not called on as much as boys in science class. When she talked about her present life in school and her expectations regarding the future, Selina's narratives of identity outlined barriers she needs to cross and often dismantle to carry on a fulfilling life. In the chapters and portraits that follow I will be taking a closer look at these barriers that characterize narratives of identity. I will examine the notions of *fronteras*/borders as metaphors for social location and explore social change as the act of *cruzar fronteras*/cross the borders.

Chapter 2

CRUZANDO FRONTERAS/BORDER¹ CROSSINGS

This dissertation study has been inspired by people engaged in the act of crossing borders: cultural, geographical, emotional, physical, and intellectual. In the previous chapter I initiated the reader into a journey to learn about the participants in this study as border crossers. Recent and former migrant farmers and immigrants are border crossers who face the boundaries of language, the borders of racial and ethnic categorizations, the borders of class and gender which delimit their social affiliations.

The borders --their layout and the act of crossing them-- have been central to the work of psychologists, sociologists and anthropologists alike. "The study of society," asserts Alan Wolfe, "from either a sociological or an anthropological perspective, is...inevitably tied up with an appreciation of classifications and distinctions" (Wolfe, 1992, p. 310). These distinctions and classifications emerge in notions of identity and social categories such as race, class, gender, ethnicity, and nationality.

Borders and the act of crossing them are also central themes to postcolonial and postmodern discourses that inform some versions of feminism and critical pedagogy. Postmodernity calls for remapping, challenging, and renegotiating boundaries of knowledge, fixed identities and an objective representation of reality. Postcolonial discourses establish relationships between a legacy of colonialism and a politics of difference that delineates borders, calling into question notions of marginality and examining the possibilities and implications of "border crossings" (Giroux, 1992).

In this dissertation, the notion of border crossings connects personal experiences to a broader history of colonialism that defines our social location as females, colored,

¹ I am using the terms boundary and border indistinctly to translate the term "frontera." Note that the connotation of permanency of the Spanish word "frontera" renders an important set of meanings to the act of crossing the border. As permanent boundaries, "*fronteras*"/borders stifle the possibility of changing the limits and place the burden of change on the immigrants.

Latinas, Hispanics, and Mexicans. The notion of border represents a geographical divide between the U.S. and Mexico, but it also speaks to all the forms of identity assigned to the Other, the alien, the immigrant, the migrant. The notion of border is also a helpful way to represent knowledge bounded in the discipline of science; it is a useful metaphor to reflect on the demands placed upon the "border crossers," our students who make the move to be included in the realm of science.

In this chapter I will first focus on borders and border crossings, both as representations of my personal experience of crossing the U.S. frontier, and a conceptual frame to read the literature that informs this study. I explore the notion of border as a central concept in the formulation of a politics of identity in reports describing population trends in the United States. This exploration of the ways a particular ethnic group has been portrayed in national and state reports is followed by a section that focuses on gender identity as it has been used in the field of science education to inform both research and policy. Finally, I conclude this chapter by sketching a conceptual framework for reading and interpreting the narratives of experience constructed by the participants in this research study.

My Birth as an Alien

It was August, 1986. I stood behind the thick yellow line dividing the space between the immigration officer's booth and a sea of people waiting to be admitted to the United States at the Miami International Airport. Like many other people often standing in this huge room, I came by jet, in search for education. I filled in the blanks in the little white immigration paper with a nervous shake in my hand, knowing that the blue cover on my green passport would not conceal my identity. My point of departure was Bogota, Colombia. As soon as the immigration officer recognized my nationality, I would immediately become a suspicious drug trafficker. Red lights would flash and, if lucky, I would just be scrutinized by long questionnaires and incisive looks. All the horror stories I had heard about friends taken away, stripped, and humiliated at customs crossed my mind. With my papers in one hand and a picture of Matt, my husband, in the other, I stepped firmly towards the booth holding my head up high. I could always appeal to my marital relationship to a United States citizen. He waited for me at a music camp in upstate New York, where he would be conducting the orchestra for the rest of the summer. I also held tightly an admission letter from Michigan State University hoping it would carry some weight. I handed my papers to the custom's officer while displaying the widest smile I could ever show. Followed by a brief "hello," the officer greeted me with a long silence. He browsed through my papers thoroughly, then checked the computer screen. He then looked at me straight in the eyes and replied: "Let's go Spartans!"

Spartans only evoked images of the Peloponnesus and, for a short instant, I wondered if there had been a mix up with some Greek celebrity. Little did I know at the time that I had entered the culture of football—Big Ten, Big Time! Soon after my arrival I learned that the presence of a big ten football team on our campus had a clear, determinant influence on the ways we did things at Michigan State, from men wearing roses on their sweat shirts to the resignation of our University's president.

If 1986 left an indelible mark in our lives at Michigan State University, for it was the season leading to the Spartan's triumph at the Rose Bowl, the traces it left in me were no less important. I look back at this year as a boundary marker of time, space, and identities. The years after 1986, when I crossed the geographical border of the United States, have been driven by my adoption of new identities, some of which were chosen and others assigned. The act of crossing the border endowed me with a set of descriptors regarding my migratory status, ethnic origin, and racial background, which were new to me. This was a year when I adopted an English last name to become an official Hispanic alien; the year when my home food became ethnic; the year when I became aware of my color.

Today, ten years later, I view this decade of my life as a process of becoming someone else, but always in continuous dialogue with my previous identities. An alien and at the same time a local; Latinoamericana and Hispanic; white and woman of color; professional and student; motherless and mother. This has been a time of developing awareness, when I can look back at my own background and see the seemingly invisible traces of a historical past and culture I have carried with me to this new setting.

Crossing the borders has meant relocation, re-positioning myself in a different social context. It has meant becoming an outsider within, for I seldom view myself as insider in this new location, or, for that matter in my once familiar home. I adopted the label Hispanic, a new descriptor for myself, as I filled out the boxes of administrative forms that do not allow any other choices. My "expertise" about my own culture vanished throughout the process of translating my Latina identity into the language of Hispanic minorities.

As an immigrant to this country I gained the status of outsider unintentionally. By stepping onto foreign territory I was compelled to relearn and negotiate my identities, a condition that became an invaluable advantage to my research. The questions generated by my attempts to understand and conceptualize "Hispanic" pointed at the invisibility of cultural assumptions which are subtly and effectively hidden behind social norms and rules that color our observations. Life in a foreign country highlighted the cultural points of dissonance, or in Rich's words, the "sites for psychic disequilibrium," where I looked at the mirror and saw nothing.

The research questions that guide this study are shaped by my own efforts to make sense of a culture that is at once alien and too familiar. My interest in pursuing a research study that looks into the meaning of identity and its connection to science stems from my own search for self in a new culture, where I need to negotiate –with myself and others– the new person I am becoming.

I came to this study with essentialist notions of ascribed and unchallenged identity which were shaken in the process of crossing the U.S. border. As a political act, I experienced border crossings voluntarily. This process required a stage of border recognition and awareness of a sense of self and other. It required willingness to move beyond the border and it required developing a notion of "we," membership in social groups separated from the rest. But even though these acts were driven by my goal of attaining higher levels of education, the process of adopting new identities was not necessarily a voluntary act. The act of border crossings, accompanied by a growing awareness of the process of racialization, moved me to join a communitary "we" among *mujeres de color*/women of color, an identity I did not recognize before I crossed the U.S. border.

In retrospect, I see a politics of purity and separation informing this process of shaping my identities after the act of border crossings. "According to the logic of purity," writes Argentinean philosopher María Lugones, "the social world is both unified and

fragmented, homogenous, hierarchically ordered. Each person is either fragmented, composite, or abstract and unified—not exclusive alternatives" (Lugones, 1994, p. 463). The homogeneity implied in my new identity labels "Hispanic" and "minority," the fragmentation of my gender, class and ethnic identities, the derogatory labels attached to the groups of which I am a member were all involuntary acquisitions.

I was born again in this country as a Hispanic, a term used by the U.S. Census Bureau to categorize, fragment, and unify people to fit under collective single origins:

Persons of Hispanic origin are those who classified themselves in one of the specific Hispanic origin categories listed on the questionnaire—"Mexican," "Puerto Rican," or "Cuban"—as well as those who indicated that they were of "Other Spanish/Hispanic" origin. Persons of "Other Spanish/Hispanic" origin are those whose origins are from Spain, the Spanish-speaking countries of Central and South America, or the Dominican Republic, or they are persons of Hispanic origin identifying themselves generally as Spanish, Spanish-American, Hispanic, Hispano, Latino, and so on. (U.S. Census, 1992)

Grounded in a logic of purity, the U.S. Census does not allow for coexistence of *mestizaje*,² a "world of curdled beings," living in a social world that is "complex and heterogeneous," where "each person is multiple, nonfragmented, embodied" (Lugones, 1994, p. 463). Rather, the census seeks to unify under one category the multiple identities embodied in one person:

During direct interviews conducted by enumerators, if a person could not provide a single origin response, he or she was asked to select, based on self-identification, the group which best described his or her origin or descent. If a person could not provide a single group, the origin of the person's mother was used. If a single group could not be provided for the person's mother, the first origin reported by the person was used. (U.S. Census, 1992).

The girls who participated in this dissertation study had diverse backgrounds. We all shared a common history of Spanish colonization, but we differed in our social locations as marked by class differences, grades of skin color, generations in the U.S., and degrees of cultural assimilation. These differences, however, did not preclude the Census bureau from lumping us all under one category: Hispanic. It is within a social world where the

² Anzaldúa (1990) speaks about *mestizaje* as a mixture of races, a product of the transfer of cultural and spiritual values of one group to another.

logics of purity and separation dominate the ways we are marked with identity labels that I found myself and the "*Mexican/American*" girls participating in this dissertation study. Let us take a brief look at our place as Hispanics in the context of the U.S. educational system, in particular in Michigan.

Us and them in the U.S. and Michigan

The combination of demographic changes and the increasing globalization of the economy have led policymakers and analysts of the educational status of "Hispanics" in the U.S. to raise alarming concerns in regards to the future of this ethnic conglomerate. Researchers have pointed at trends which impair chances of economic security and the well-being of Hispanics (Lambourne and Baca Zinn, 1993). Low levels of educational completion, underrepresentation of Hispanics in college and high incidence of drop-out rates are just a few of many indicators used to describe the poor state of education among Hispanics.

In the state of Michigan the scenario reflects concerns stated at a national level. Grouped under one broad category of "Hispanics," the census figures tell us that in 1990 we constituted 2.2% of Michigan's population (Siles and Aponte, 1995), a relatively low number compared to the increasing proportion of Hispanics in states like Texas and California. But a closer look at population figures in Michigan renders two important trends. One is that Hispanics accounted for more than 56% of the total state population increase between 1980 and 1990, as reported by Robert Aponte and Marcelo Siles (1994). This increase in the numbers of "Hispanics" in the state of Michigan is accompanied by a growing demand of higher levels of education for future employment opportunities. There is reason for deep concern in regards to the new economic trends and educational demands. Hispanics 25 years and older have the lowest levels of school completion, with only 61% having diplomas as compared to 65% Blacks and almost 79% of Whites. At the other end of the spectrum, one third of Hispanic children in Michigan between the ages of five and seventeen, appear to be out of the public school system (Siles and Aponte, 1995). Looking

at these numbers, it becomes apparent that policy makers, teachers and educators in the state of Michigan face an imminent problem of attending to the needs of the largest growing population in the state, one which is not accounted for in the public school system.

How does this scenario relate to specific concerns about identities and science education? Educators in the field of science have repeatedly warned the nation about the underrepresentation of girls and minorities in science. Interestingly, these two categories are often lumped together as a unity, i.e. women, or fragmented as exclusive alternatives, i.e. women or minorities, following a logic of purity and separation. In the next section we will explore the rhetoric of inclusion of Hispanics in the process of schooling, particularly in science. I will raise the issue that examining identity and its meaning in education is a fundamental preliminary step to the formulation of a politics of inclusion. This, I believe, should be the case in science education, a field presumably guided by the democratic principle of achieving science for all.

Including Who? Re-visiting the Goal of Science for All

The metaphor of border crossings is useful once more as a way of creating an image of the process entailed in achieving the goal of science for all. The move towards inclusion of all presupposes the recognition of borders, and awareness of exclusion of *some* from full participation in science. Who are these *some*, and what are the proposed strategies to accomplish the goal of science for all?

The following selection from *Science for All Americans*, a set of recommendations issued by the American Association for the Advancement of Science (AAAS, 1989), identifies who is left out from the field of science and proposes a strategy towards their inclusion:

Because the scientific and engineering professions have been predominantly male and white, female and minority students could easily get the impression that these fields are beyond them or are otherwise unsuited to them. This debilitating perception—all too often reinforced by the environment outside the school—will persist unless teachers actively work to turn it around. Teachers would select learning materials that illustrate the contributions of women and minorities, bring in role models, and make it clear to female and minority students that they are expected

to study the same subjects at the same level as everyone else and to perform as well. (p. 151)

The above statement points at females and minorities as the *who* that is left outside the boundaries of science. It also suggests that their absence in science is a problem of perception which can be fixed with some effort on the part of teachers. The document points at the need to include role models, the exceptional among minorities and women who have made significant contributions to science, and it advocates clarity on the part of teachers so female and minority students understand they are expected to do well. To cross the science border, the document suggests, females and minorities are expected to make the move from outside the limits of science to the inside, without transforming themselves, or the inner core of science.

The problem of inclusion raises many questions regarding its politics. One is the very identification of the excluded as fragmented, partitioned, individuals of a certain gender, or as people portrayed as minorities even in educational settings like California where they already constitute the majority in many educational settings. The term minority often disregards numbers, and it also conceals diversity of historical backgrounds and social locations of people grouped under this broad category. Another issue regarding inclusion relates to the process of border crossings. If it is assumed that a given group of people are excluded from science, then it is expected of these people to cross the border of science and carry the burden of change, without problematizing the consequences of crossing those borders. I wonder for example, in what ways will the identities of the excluded get transformed by crossing the border of science? Why would the excluded want to be included in a science supported by structures that favor white males? Are strategies like changing perceptions the ones we need to take care of the problem of exclusion from science? Can we accomplish inclusion without dismantling power relations that led to a science primarily constructed by white men?

I raise these questions not because I intend to answer them in this study, but because I want to direct discussions about inclusion in science towards a deeper inquiry on

identities and the ways these identities matter in the lived experiences of girls identified broadly as female and minorities. Inclusion in science, I argue, must begin with an examination of identity borders,³ the social structures and ideologies that limit opportunities for full participation in educational processes. The process of inclusion must entail an examination of the borders that constrain science and the borders which delineate the multiple dimensions of identity that shape individuals' experiences.

Identity Matters in Science Education: Gender

When and how do identities matter? In particular, gender identity has gained attention among researchers in science education interested in the problem of underrepresentation of women in science. A growing body of research on gender issues has contributed ample documentation and explanations to the problems of entrance and retention of girls and women in science. This field of research is grounded on the basic assumption that men and women are different and that these differences, in turn, impact the ways students connect to science.

As the overriding dimension of identity, gender has shaped definitions of inequalities in science participation and informed the corresponding strategies to correct underrepresentation of girls and women in science. It is estimated that during the 1970s and 1980s as many as 600 programs were developed in the U.S. to improve the quality and quantity of education in science and mathematics for females (Parker et al. 1995). Recommendations for improving gender equity focus on disrupting gender stereotypes, such as male images of science and scientists and including women scientists as case studies; avoiding gender bias in language, choice of examples, content, context and mode of assessment in science; and collecting and publishing data on gender differences (Parker, *ibid.*).

³ The notion of identity as a border marker applies to social locations like race, class, gender, and ethnicity. In this dissertation identities have been explored as markers of difference in the context of narratives. I am not arguing, however, that identities only represent discourse practices without material consequences, or mere states of mind which can be transformed individually. My route to enlighten our understanding of identities as they impact the lives of girls of Mexican descent has been to listen to the ways they use identity markers to construct narratives of experience.

Research on differences between females and males is built upon different assumptions. One stems out of the premise that differences between sexes are expressions of genetic make-up. The other strand looks at gender as a social construction. The former line of research can be exemplified in a landmark publication, *The Psychology of Sex Differences* (Maccoby & Jacklin, 1974), which reports differences in quantitative, spatial, and verbal abilities between males and females. Even though still pervasive, genetic differences between sexes have been challenged in science and mathematics education as explanations for differential outcomes such as achievement and participation in science (Linn & Hyde, 1989; Kahle, 1994).

Rooted in the women's movement of the 1970s and 1980s, a view on differences as socially constructed has informed current research on gender in science education. Within this tradition, there is a distinction between sex and gender, the first being a biological attribute and the latter "the cultural transformation of male and female infants into adult men and women" (Keller, 1986 as cited in Kahle, 1994). Based on the premise that gender is the product of cultural activity, researchers in science education have studied "environmental factors" to account for differences in achievement, entrance and retention of girls and women in science. The work of Jane Butler Kahle (1994) exemplifies this tradition of research on gender issues in science education. A historical overview of her work (Kahle, 1994) reveals that teaching behaviors and instructional techniques were the focus of study and intervention in the early 1980s. Towards the middle of the decade, Allison Kelly drew researchers' attention towards an examination of the perception of science as a masculine activity, from the dominant presence of males as practitioners of science, to the ways science is practiced in schools and packaged in instructional materials (Kelly, 1985).

Another influential line of inquiry that informs the ways researchers have looked at gender as a category that matters in science education is the work of Ken Tobin on target students—students who interact more frequently with teachers (Tobin, 1987; Tobin &

Gallagher, 1987). Tobin's work revealed an uneven pattern of participation where males tend to outnumber females by a ratio of 4:1. This finding pointed at the need to explore gender interaction patterns in the classroom, including teacher-student, student-student, and student-teacher interactions (Tobin, Kahle, & Fraser, 1990 as cited in Kahle, 1994).

An approach to the underrepresentation of girls and women in science within these research traditions encompassed the formulation of instructional strategies for intervention, from emphasis on laboratory work, presence of discussion groups, use of printed resources, and emphasis on creativity, to an examination of masculine images of science. A focus on "environmental factors" in studies of gender in science education has contributed a set of guidelines for research and intervention that attempt to promote change in gender-role stereotypes and individuals' expectations for success and failure. (Kahle, *ibid.*).

Another direction for research on gender in science education is moving our discourse beyond the identification of variables that influence participation in science and the consequent manipulation of environmental factors to attract girls into science. Drawing from feminist perspectives on pedagogy, in particular the work of Peggy McIntosh on curricular re-vision of history (McIntosh, 1984 as cited in Rosser, 1986), Sue Rosser (1986) proposed substantial change in science education, one that attempted to reconstruct science "Science Redefined and Reconstructed to Include Us All" (p. 16). In her publications, *Female Friendly Science* (1990) and *Biology and Feminism* (1992), Rosser directs our attention towards an inclusive science which is challenged in its epistemological assumptions. Informed by the influential work of Mary Field Belenky, Blythe McVicker Clinchy, Nancy Rule Goldberger & Jill Mattuck Tarule (1986), in *Women's Ways of Knowing*, Rosser examines the notion of objectivity and distancing between subject and object of study --characteristic of the scientific method--as an explanation for the underrepresentation of women in science. The problem of attracting women to science, Rosser suggests, must contemplate pedagogies that emphasize "connection" between

knowers and the objects of study rather than an assumed separate standpoint (Rosser, 1992).

"Female-friendly" is an approach to science endorsed by Anita Roychoudhury, Debora Tippins and Sharon E. Nichols (1995). In their recent publication, *Gender-Inclusive Science Teaching: A Feminist-Constructivist Approach*, the authors discuss gender issues in a physical science course built upon feminist standpoint theory and constructivist epistemology. This work builds on an assumption in feminist standpoint theory (Harding, 1991) that men and women experience the social world differently, and consequently they develop different standpoints in life: "Women, as a result of their different lived experiences, have a distinct standpoint which can bring in different experiences and engender a certain pattern of thought and understanding that is absent from science" (Roychoudhury et al., p. 898). Secondly, the authors root their work on a constructivist premise, that "knowledge is constructed by cognizing beings through their experiences and reflections on those experiences" (*ibid.*, p. 900). The authors propose that in addition to approaches like removing biases from teacher interaction, textbook, and laboratory activities science instruction needs to develop a female-friendly approach by incorporating feminist theories and methodologies. This approach considers that women's experiences and ways of knowing are rendered marginal in science classes: "We contend that if the lived experiences and the epistemologic proclivity of women are marginalized in science classes, it will be unlikely that they would feel interested in making sense of their experiences relative to the subject" (*ibid.*, p.900).

Researchers of gender in science education are posing challenges that are distinctly different. On the one hand, a body of literature calls for instructional techniques and the development of teaching skills and strategies that encourage more girls to participate in science. On the other hand, there is a growing awareness of the need to transform the core of science and to construct pedagogical approaches leading towards the inclusion of women's and girls' experiences in the realm of what counts as science. Such attempts to

transform the science curriculum to include the experiences of women are exemplified in college chemistry (Barton, 1995), college and high school biology (Rosser, 1986, 1992); science education (Roychoudhury et al., 1995), and elementary science (Roth, 1995).

In spite of these different directions for change, it could be argued that the different challenges presented by researchers in science education who attempt to include girls and women, are not necessarily exclusive. In fact, they could well complement each other, as long as the advocates of inclusive science recognize that power relations need to be overturned, both in the creation of equitable classroom environments and in the construction of a science which validates the experiences of girls and women. But I ask, will these directions translate into strategies that enhance full participation of "minority" women in science? This question leads me to examine the category of gender and its impact on lived experience in the contexts of schools, from the perspective of feminist scholars who advocate a new direction for research, one that attends to the experiences of women of color.

Gender, Culture and Color Matter in School Science

I would like to turn to the literature of feminist women of color to identify three themes which have been central to my dissertation work. One is the critique of the location of middle-class white women's experiences at the center of social analysis in feminist studies. Second, are the attempts to analyze and interpret women's experiences within interlocking systems of oppression to debunk a hierarchical organization of identities where gender supersedes all other forms of oppression. Third, are the themes of voice and silence, as conceptual frameworks for political action, to locate girls of Mexican descent at the center of analysis and to listen to their stories. In this section I will address the first two themes. The theme of voice is thoroughly analyzed as a methodological approach in the chapter that follows.

Sari Knopp Biklen and Diane Pollard (1993) open the *Ninety-second Yearbook of the National Society for the Study of Education* dedicated to studies on gender and education with the following statement:

Put very simply, we might say that one's sex is involved in every activity connected to education. Since every interaction involves a male or a female, sex is everywhere; we must take it into account. When to take it into account looms as a big question because it may be central even when it seems to have no relation to what is going on. But being male or female carries few meanings in and of itself; its most potent meanings come from the social and cultural meanings attributed to it. These meanings we call gender, the social construction of sex. (p. 1)

Feminist scholarship has drawn our attention towards the everyday experiences of girls and women. By placing women at the center of analysis, feminists have attempted a better understanding of a world which has been explained primarily from white male European perspectives. But even though the centrality of female experience is a tenet in feminist studies, there is disagreement among feminists regarding the conceptual understanding of gender and the mapping of pathways for political action.

The assumption that gender matters in schools has led some scholars to emphasize differences across gender borders, while down playing difference within gender categories. Studies informed by this view of gender, examine the qualities shared by all women grouped under one broad category. On the other hand, a branch of feminist scholarship is developing in a different direction, one that recognizes the claim that gender cannot be separated from other identities. Rooted in this "multipositional" or "multivocational" (Biklen and Pollard, 1993) view, feminist scholars are examining differences within the categories of girls and women to explore how gender is related to other social positions like race, class, and ethnicity.

My work is closely related to this latter body of research proliferating among feminist women of color. The work of Maxine Baca Zinn, Bonnie Thornton Hill, Patricia Hill Collins, Gloria Anzaldúa, Victoria Muñoz, Maria Lugones, bell hooks, Patricia Zavella and Aída Hurtado, among other women of color, has shed rich theoretical perspectives to ground this research study.

In *Women of color in U.S. Society*, a collection of essays by women of color, the editors Maxine Baca Zinn and Bonnie Thornton Dill (1994) write:

This book grew out of our concern about the exclusion of women of color from feminist scholarship and the misinterpretation of our experiences...Since we began this volume, feminist scholarship has taken on the challenge of studying the diversities of women's experiences. This new direction is transforming much of what we know about women and the social worlds we occupy. (p. xi)

With this new direction to orient my work, I asked, "What does it mean to be a girl of color, a Mexican/American, a Hispanic, Latina, and Chicana attending public school in an urban setting in the mid-West? How do identities like gender, class, race, and ethnicity create relations of dominance and relations of power and privilege for these girls? How do these identities matter when it comes to gaining access or obstructing pathways to science?

As a framework for the study of identities I rely on the notion that "Identity is within discourse, within representation. It is constituted in part by representation. Identity is a narrative of the self; it's the story we tell about the self in order to know who we are" (Hall, 1991 as cited in Muñoz, 1995). My work rests on the assumption that narratives of self reveal important insights about the process of shaping social identities in school settings.

An analysis of stories of identity assumes criteria to select the narratives I chose to tell in this dissertation. My ears were particularly tuned to stories that marked the boundaries of group memberships like race, ethnicity, nationality, number of generations living in the U.S., age, class, gender, student, language and religious affiliation for evidence of social categorizations. I listened for descriptions of the process of social identification, for points of comparison across groups, and responses to social affiliation. This framework for analyzing narratives of the self draws primarily from the work on social psychology that attempts to connect history and macro-social environmental features to individual modes of adaptation to immigration (Hurtado et al., 1994).

It is through the writings of women of color that I gained insights into a notion of identity as "an ongoing internal plurality forged and changed in and by time and place"

(Muñoz, 1995). Drawing from the work of Gloria Anzaldúa, I was guided towards an understanding of identities as a process of negotiation between "inner, outer and peripheral 'I's within a person and between personal 'I's and the collective 'we' of our ethnic communities" (Anzaldúa, 1990).

The struggle is inner "Chicano, indio, American Indian, mojado, mexicano, immigrant Latino, Anglo in power, working class Anglo, Black, Asian--our psyches resemble the bordertowns and are populated by the same people. The struggle has always been inner, and is played out in the outer terrains. (Anzaldúa, 1987 as cited in Muñoz, 1995, p. 43)

Anzaldúa (1990) and Muñoz (1995) point to a dialectical understanding of the social identities of the girls participating in this study, as a negotiation between the inner "I" and the collective "we." This inner process of negotiation is depicted as a struggle in the psyches of people like the participants in this study, still living at the borders:

These ways of understanding social identities oriented me to listen to Selina's words in the first portrait that opens this dissertation for claims of social affiliation, for comparisons across groups and evidence of negotiation and conflict in her membership claims. Evidence of conflict emerged, for example, when she compared her Mexican, minority, less academically successful friends to the White academically successful students. Being one who claimed both Mexican and American identities, and one who considered herself a good student, Selina faced the conflict of identifying herself as a person who is at once Mexican and academically successful.

The work of women of color also offered a direction for research on social identities which acknowledges identities as multidimensional. In *The Impact of Mexican Descendants' Social Identity on the Ethnic Socialization of Children*, Hurtado et al. (1994) wrote:

Although ethnicity is undeniably significant, it is not the only critical dimension affecting the social identities of Mexican descendants...To isolate one criterion as capturing the essence of ethnicity is to artificially limit and simplify its nature and to represent the Mexican-descent population as a homogeneous aggregate. (p. 133)

The authors recognize the exclusive focus on ethnicity as a pitfall of identity research with people of Mexican origin. This critique is reminiscent of research in science

education that focuses on the salience of gender over all other forms of group membership. To develop inclusive policies in regards to people grouped under categories like "minorities," "women," "girls," "Hispanic," and "Mexican," it is important to see beyond their ethnic, gender, class, race group memberships as separate aggregates and instead, recognize the interconnections between different forms of group membership. In this regard, the work of Patricia Hill Collins (1995) offers relevant insights:

Seeing inclusively is more than just seeing the world through the perspective of any one group whose views have been distorted or ignored. Remember that group membership cuts across race, class, and gender categories...Inclusive thinking means seeing the interconnections between these experiences and not reducing a given person's or group's life to a single factor. In addition, developing inclusive thinking is more than just summing up the experiences of individual groups. Race, class, and gender are social structural categories. This means that they are embedded in the institutional structure of society. (Andersen & Collins, 1995, p. 4)

Collins (1990) calls for a politics of inclusion that views race, class and gender as structural categories and intersecting systems of relationship and meaning. With these concepts to guide my reading of narratives of experience, the stories of self in relation to science reveal the ways social memberships like class, race and gender are structures embedded in the experiences of adolescent "young ladies" of Mexican origin. If we think about the ways the participants position themselves when they talk about science and science class, we begin to see their experiences embedded in a social system where their color, ethnic affiliation, gender and class inform the ways these girls view themselves in science.

Ramón Saldívar's work on literary analysis provided yet another framework to read the narratives in this dissertation as "accounts of experience" with particular characteristics. Saldívar (1990) argues that "Chicano/a narrative is not content with merely reproducing the world but also attempts to reveal the ideological structures by which we continue to create that world" (p. 9). As a strategy, Chicano/a narrative is a process he terms "the dialectics of difference," which helps "demystify the relations between minority cultures and the dominant culture" (p. 5). Reading from this perspective, Saldívar's literary analysis calls for an understanding of Chicano/a narratives as:

...different from and in resistance to traditional American literature, yet ... understood in their American context, for they take their oppositional stance deliberately, in order to offer readers a reformulation of historical reality and contemporary culture that is more consistent with the way reality and culture are actually experienced than do other representations. (p. 9).

The stories that constitute this study are not yet part of a literary mainstream or even a Chicano literary tradition. However, these narratives represent a view of a historical reality which is often simplified and atomized in positivist approaches to teaching and learning. If we look at them from the perspective of Saldívar's literary analysis, these narratives may offer important insights to teachers, teacher educators and educational reformers in the field of science. These stories reveal the complexities of cultural and historical locations which hinder attempts to change the quality of participation in science and the numbers of people from particular groups who engage in science-related fields.

To summarize, I would like to go back to the beginning of this chapter and briefly recapitulate the conceptual frameworks that inform this investigation on identities and science. This work is informed by personal experience and the texts on reform and research in science education that highlight identities as a category of analysis. I began by sharing a narrative that describes the emergence of identity borders in my personal experience, once I relocated in U.S. territory. By crossing the border, I became more aware of the process of shaping identities as a consequence of re-positioning oneself in relation to others. In this new location I gained insights to understand identities as a process shaped by time and place, rather than an essential attribute. This work is also rooted in my reading of reports and research on science education that highlights the borders of race, color, ethnicity and gender as markers of difference to explain educational outcomes and inform educational policy. A third section of this chapter focuses on the literature of women of color which offers a critique of a politics of inclusion grounded in essential notions of identity that rest on the assumption that identities are individual, additive, and hierarchical. The writings of women of color call for resistance to current notions of inclusion as a process whereby "women and minorities" step into the realm of science through a simple process of

changing perceptions among students and teachers (AAAS, 1989). Grounding this research study on the work of women of color, I assume that identities are embedded in social institutions, but they are also negotiated and forged by time and place. This set of assumptions raise interesting issues regarding a politics of inclusion in science that at once recognizes constraints and possibilities for social change.

In the pages that follow, I invite the reader to become a border crosser. Drawing from the writings of women of color, from research in science education and feminist scholarship across different disciplines, I see a picture of diverse and conflicting ideas that might inform a reading of these narratives. On the one hand, I envision readers who make the borders of science central to the formulation of a politics of inclusion. For them, science remains intact, while the border crossers, those outside the realm of science, step into its territory. Throughout a reading of the narratives constructed by the participants in this dissertation study, it is my hope that these readers listen to the ways the identities of Mexican girls are shaped in school settings, particularly in science. It is my hope that these skeptics become the border crossers, too, who attempt to understand social membership in relation to those others we have constructed as marginal to the realm of science.

In another context, there might be an audience that views gender as the dimension of identity that overrides students' encounters with science. While this audience might not view the borders of science as intact, it is my hope that these readers will see the multidimensional qualities of identities and begin to envision inclusive thinking that takes into account the system of meanings and relationships across the boundaries of class, race and ethnicity.

Another group of readers might locate themselves in a postmodern turf, where democratic principles demand a total deconstruction of identity borders. My hope is that the words you are about to read will talk to everyone along the continuum of border demolition and preservation. But these words require of the reader to understand these narratives in

their full complexity, to look at the intersections of race, class, gender, and ethnicity in narratives that once re-instate and critique identity formations.

As a border crosser myself, I learned to recognize the fluid qualities of identities and their impact on my experiences. I hope other border crossers will seek a politics of inclusion where the intersection of race, class, gender, ethnicity is recognized as a structural border in educational settings; a reader who seeks the transformation of the borders of science to reach people like Lupita, another participant living at the borders, between two cultures; moving at the boundaries between childhood and womanhood; between White and woman of color.

LUPITA: PORTRAIT TWO

"People...they call me Mexican"

On Wednesdays and Fridays, I picked up Lupita at Williams Middle School. Invariably, I spotted her from the distance, standing in the middle of the parking lot, surrounded by cars and hundreds of students. She stood out with her tall figure and long wavy black hair, usually arranged in a pony tail or a bun. Lupita's big loops hanging from her ears, her baggy shirts and pants seemed oversized to me, but they fit in with the fashion most girls were wearing. I could always count on her commitment to wait for me after school with a gentle greeting and a pleasant smile. Sometimes I picked up Lupita at her home, a cute, tidy house surrounded by a manicured garden with seasonal flowers on the West side of Cedarville, about 20 miles from our Friday meetings. The "preppy" neighborhood where she lived, a qualifier her friends assigned to quiet areas with few kids on the streets and dominated by White people, was distant from most of the other girls' neighborhoods.

While Lupita and I engaged in conversation on the way to our meetings, I always felt like I signed up for a unique tour around town. As I drove, she often pointed at kids walking by, gave me reports on their names, relatives, friends, and hangouts. It was through Lupita's ways of seeing and labeling the world that I learned to look back at Cedarville to see it in black, white, and Mexican.

[Fieldnotes-12.12.93]

Lupita was thirteen and beginning seventh grade at Williams Middle School¹ when we first met. She lived at home with her fourteen year old brother and their parents. Lupita and her brother were both born in Cedarville, where their parents had settled looking for better job opportunities. Their mother, a former migrant worker in her childhood, was now working as a custodian at the State University. Their father worked as a bus driver at the same university. In spite of the distance, Lupita maintained ties with an extended family still spread throughout the country in Colorado, Texas, Illinois, and Mexico, a country she had recently visited.

Getting to know Lupita required more than just interviewing her. After our first encounter at the Migrant Education Summer Program, I felt like a stranger in this young girl's world. The way she chopped up her sentences, her quickly scattered manner of

¹ In 1994 Williams Middle School reported a total population of 1200 students: American Indian 1%, Black 31%, Asian 3%, Hispanic 9%, White 56%; a male/female ratio among Hispanics of 61/43. The percentage of students with satisfactory grades on the MEAP test in 1993-1994 was: math 23.5, and science 48.2. The percentage of students whose financial resources made them eligible for free and reduced lunch was 40.8%.

speaking, her accent, and the slang she occasionally threw into our conversations contributed to my feelings of being an alien in her life.

Lupita: I'm the kind of person that, say that a person five years old, they hang around with me and they don't talk to me. And I don't like that, because I want a person to, if they're going to follow me around, well then they have to talk to me too.

Constanza: Okay, so you told me some things you really like about people. That they talk to you, right? Okay. What else can I say about yourself so people get a sense that this is this person?

Lupita: I'm the kind of person that... well, my mom says I'm a kind of person that, you know, you first you have to get to know the person and then your feelings kind of change in a way. And, uhm, I'm a kind of person who kind of gets, you know, get revenge. Don't get mad but get revenge on a person.

Constanza: Uh-huh. Okay. So when your mom says that, what she means is...

Lupita: On the outside I'll be kind of mean, but in the inside, [unintelligible] kind of nice, though. 'Cause, you see, I don't like to brag about myself, me and my brother, but when we fight we, my mom says we fight like animals. Because now she made up a rule that, now when we fight or whatever we destroy inside the house, we have to pay for it. 'Cause me and my brother, we fight wild.

[Lupita-Interview-7.15.93]

The persona of a strong girl beating up her brother was not the one Lupita displayed to me. When we met, she acted as my interpreter. I picked up Lupita to meet with me twice a week because she participated in two different conversation groups. This allowed me to spend more time with her than any other participant in the group, and it also gave me an opportunity to meet her friends. Spending time with Lupita's friends I often felt caught in the middle of an insider's chat—with no clues as to what caused the girls' anger, pain, or laughter. Not only did they speak a language I had difficulty understanding, but they talked about situations that were removed from my own personal experiences. In these situations Lupita would act as someone who puts herself in "somebody else's shoes," and help me sort things out by filling in the blanks and attempting to connect their experiences to my own.

"People... they call me Mexican," responded Lupita when I asked how people described her background. Even though she had often heard the words Hispanic, Latina, and Mexican American, she preferred to be called Mexican or Chicana:

Hispanic, it seems that it comes from Spain... Mexican-American, I think it feels like, kind of the whitish in a way...Every single time I heard that word [Latina]... I get a ... picture of Mexico and the Central America, that's what I get. I use Chicano. Because on the /unintelligible/ movie, and we'll say, this guy, you know in parades and stuff, and on the bus he started saying: "Chicano power." And the bus driver, she was white, or something, and she didn't like it. I feel more American than Mexican, but I want to feel more Mexican. I want to learn to speak their tongue and stuff.

[Lupita-Interview-7.15.93]

Like other participants whose families have moved to the U.S. more than one generation ago, Lupita's ethnicity moved on the border between Mexican and American. Apparently, at the time I met her, Lupita was beginning to claim her Mexican and Chicano identities, while removing the label American from her definition of self. By establishing her social identity as Mexican or "Chicano," Lupita gained a sense of personal pride and growing self-esteem. However, this pride, as one can read from the narratives that follow, evolved through time. It was not born in her:

Constanza: You know what, last time we talked you mentioned that you wanted to go to a school where there were more Mexican kids. Why is that important to you?

Lupita: It's important to me, because, you know, it helps my self-esteem to go higher, you know, to be proud to be Mexican. 'Cause when I was little, I was, uhm, I went to Florida and I got real dark, like, because a little like African-American. And I didn't like myself the way I looked. And then I wanted myself to be, you know, looking white skinned. And then now, right now, I want myself to look like I did last time.

Constanza: You want to get darker again?

Lupita: Yeah. But the more I get, the more I go in the sun, the more I get freckles. I have to put, you know, suntan lotion or something like that.

Constanza: So you think if you're around people who are darker, you're going to feel better?

Lupita: Yeah, in a way, no, no, it's just that [pause] well, it's hard to explain though.

Constanza: Because you were saying that your self-esteem would be [pause]

Lupita: Yeah, because, it makes me feel proud because, you know, just looking at them makes me, you know, feel happy that I'm Mexican, and the way they talk and stuff.

[Lupita-Interview-7.15.93]

I find it very interesting to listen to Lupita's narratives about the shaping of her ethnic and racial identities as evidence of two seemingly contradictory qualities of identity formation. On the one hand, Lupita's story about her identification as a person of color underscores the presence of structural racist forces that she cannot escape. In the little girl she described above, the forces of racism that shaped her identity claims led her, as a child, to want to pass as white: "And I didn't like myself the way I looked." Later in her life, she claimed she wanted to look dark skinned: "I want myself to look like I did last time." This assertion, and her reaffirmation of pride in her Mexican identity: "I want to feel more Mexican...it helps my self-esteem to go higher, you know, to be Mexican," are both evidence of transformation of Lupita's responses to an identity that is forged by time and place and enhanced by a growing political consciousness. While the forces of racism were still a part of her life, Lupita seemed to be developing a notion of race that connected her to Mexican pride, thus shaping an identity that ran against the grain of derogatory stereotypes. It appears to me that by calling herself "Chicano," Lupita was developing a sense of membership to an ethnic/racial group that has turned around the meaning of "color," and "la raza," to transform them into symbols of pride.²

As the following story illustrates, Lupita viewed race both as an obstacle to gain access to opportunities like housing, and also a condition that "colored" the ways she related to other people:

² In *Ethnic Identity and Bilingualism Attitudes* (1987), Aida Hurtado and Patricia Gurin examine ethnic identity as multidimensional, including national origin, culture and language, race and color, and minority status. These authors raise the issue that applying the terms Chicano/Chicana to the self "signifies a new political identity" rooted in the Chicano movement of the late 60s and 70s, "that includes commitment to language as a basis for solidarity in the Chicano community" (p. 5). Lupita's manifested desire to learn "their tongue," and her consciousness of group inequalities are both indicators of a growing political consciousness.

Constanza: Do you think there are opportunities that close because you are Mexican?

Lupita: Yeah, because some people might think, I mean, some people are prejudice and they'd say, "no." Because I know this one boy, he's black, but he's real, real, he's a real good person. And you know, even though he's a man, you know, I, you know, I don't feel pressures about him, you know, I talk to him. But, you know, I feel comfortable about him, not by his color, but I feel comfortable by him because he's a man, that's why. Because this guy, he wanted to get an apartment, but the guy wouldn't give him an apartment, because he was, you know, black. And, um... when the, um... two or three weeks ago there was, um, another guy, there was a white guy who had, like, you know, a beer belly and stuff like that, he let that guy stay in that place. And this man over here, he dressed, you know, dressed nice and stuff like that. You know, he had good money and stuff like that. But this white person, he had, he was big and he made a point that that person was looking for was that he was white...

[Lupita-Interview-7.15.93]

This latter story marked the boundaries of class, gender and race which informed the ways Lupita read the world and lived in it. As she told a tale about access to housing opportunities, she positioned herself in relation to the main actor, a person with whom she felt comfortable talking in spite of his gender, but "not by his color." She also marked the main actor in this story as someone with an assumed advantageous class position, described as "dressed nice" as opposed to having a "beer belly." Interestingly in this narrative Lupita revealed an intricate system of oppressive forces working against the actor and the narrator. For instance, Lupita admitted the existence of "pressures" around men and a feeling of discomfort with black people, both evidence of structural racist and sexist forces acting upon her. The story also weaved in the theme of racism and racial identity, that constrained the main actor's chances of getting housing.

Unlike the political awareness Lupita often expressed when she talked about ethnic/racial identities that grew into feelings of empowerment, Lupita cast the passage into womanhood as a loss; the loss of virginity, a consequence of sexual relations which she invariably associated with men. Lupita called herself a girl and recognized the label "lady" as appropriate for teenagers who are only "half a woman:"

Lady, I think it means, like, uhm, half a woman, but it's for a teenager. So once she gets [to be] a woman is when she's not a virgin, that's what I think.

[Lupita-Interview-7.15.93]

In her narratives about home life, she interwove the borders of her ethnic, class and gender identities to sketch a portrait of the Mexican girl:

The Mexican girls... they have to do everything because the mother, she's had, probably had five kids already. The Mexican girl probably has to wash the kids, bathe them, vacuum and all that stuff because the mother has to work and prepare food for the father. Like, the mother has to wake up at four in the morning because her husband has to go to work. She works too. Like, say she don't have to get up at four, but then she has to go, get up at seven to go to work, then she'll come home, like around, eleven or twelve in the night time, and the father, like ten in the night time. And then the father won't do nothing, just drink beer or watch T.V. Or call his friends over, and he'll have them all night over there, and the lady probably get mad and... having his friends drink and all that stuff.

[Lupita-Interview-7.15.93]

Lupita used the overarching category of Mexican to label a household where the expectations for girls and mothers were dominated by a patriarchal system of oppression. But this household had other qualities. In addition to being Mexican, she described both parents as working parents. The possibilities of hiring help to take care of this household were out of the question. The mother, carrying the burden of double work duty, outside and inside the home, relied on the daughter to do the housework and take care of a growing family. In this hypothetical Mexican home, the responsibilities for the maintenance of the household and even the responsibilities towards the children relied solely on the mother/daughter and they had, at best, a tenuous connection to the father.

For many girls like Lupita, the structural constraints of class shed a particular meaning on their gender identities. In households where both parents worked outside the home, chores were most likely left to be attended by a daughter. Being Mexican and female, in a household with limited economic resources, it seemed to follow that Lupita was shaping an identity like the "Mexican girl" described above. I explored a little further Lupita's portrait of the Mexican girl by addressing the issue of unequal distribution of rights and duties in the context of Lupita's own family:

Constanza: What about the boys? Like your brother, for instance? Or boys who are in the same family, they don't do anything? Do they get the same responsibilities? Do they have to wash the kids, do they have to cook?

Lupita: It's hard, I think it's harder for the Mexican women because the women always have to remember everything... And then the man, they just say, 'Oh, wash the kid, it's your kid. It's not mine. It's probably the neighbor's kid,' whatever....[My brother] goes to his friends' houses and does whatever, and I have to do the dishes and clean my room and wash the dog, and feed the birds and all that. The women have more responsibility and more feelings /unintelligible/.

Constanza: Okay. Do you think that's true of all your girlfriends who have brothers at home? Or all your boyfriends? Are they treated at home, like, you know, they have more freedom and more rights?

Lupita: Well, most of my friends, I think they have, you know, some, they have responsibilities and when it's time to get serious, they don't want to be serious, some of them do, but some want to get serious. Like Connie, she does a lot of stuff, she vacuums, she take cares of her two sisters, and just feed herself at the same time, tries to do her own homework. And at the same time she wants to talk to me, too, but then she knows she has to fit it in her schedule to talk to me.

[Lupita-Interview-7.15.93]

Other girls like Lupita who enacted the traditional gender roles of home keepers and caregivers, found themselves constrained to interact with people outside of school. In a family that cannot afford to hire help, some girls had limited possibilities for carrying on an independent social life, and their participation in educational enrichment, after school, and summer programs was also limited by their parents' schedules and lack of resources to pay transportation.

The themes of child care and pregnancy were highlighted in my conversations with Lupita, especially during "car talk," a time we spent after our weekly meetings, when I drove some participants back to their homes, and our conversation was directed by their questions and comments. The topic of babies hit very close to home for both of us. Shortly after our first interview, Lupita's sister had a baby. Just about the same time, I discovered I was pregnant. But even though Lupita shared with me many stories about her sister's

pregnancy, she did not celebrate this event with joy. On the contrary, she wrote in her journal:

A woman should not get pregnant before she is married cause it doesn't really hurt your mother or father, it's really hurting yourself cause its not your moms fault you want to end your life so soon. You wouldn't be having fun or go to see a friend you know. Cause the baby will be crying and you will have to feed and be careful what it does. If you get pregnant and tell the boy you are, he wouldn't want nothing to do with you. When you get pregnant at an early age people might think that you are a bitch or a ho. Or they might think that you have sex a lot with different kinds of boys and get money for it. Also if your pregnant you feel deprest and scared and alone if your a single teen. You want to get the baby for adoption or try to kill you and the baby by taking drugs...If I was pregnant I would kill myself cause I wouldn't want to rise the baby by myself. I wouldn't want my mom to help me cause she would get on my back and tell me what to do. I rather rise my baby with my friends.[sic]

[Lupita-Journal Entry-undated]

Lupita described a portrait of a woman immersed in fear of carrying a range of societal labels and responsibilities in the event she became pregnant. She assumed that boys would not be held equally responsible, or subject to the same kinds of pressures. Boys, she believed, could step out of the situation and not even continue a relationship with a girl who became pregnant. She viewed the whole issue of pregnancy out of wedlock as a personal disgrace for the woman who, in addition to ruining her life because she could not enjoy herself in the same ways she did before, had to face discrimination.

As a gendered subject, Lupita located herself within a system of inequality and oppression, a passive receptor of the actions of men who would make her pregnant, abuse and abandon her. Compared to other girls in our group whose ethnicity, gender, race and class identities intersected in different ways, one thing strikes me as a strong theme in Lupita's narratives. This is her understanding of womanhood as a function of her relationships with men. In some ways, I believe the potential relationship with men shaped many of Lupita's expectations of her future life and the ways she made sense of her present experiences:

Constanza: Why do you go to school?

Lupita: So we could entertain our minds....so in the future just say some guy asks us to build a table we wouldn't know how to read directions, measure, use tools."

[Lupita-Interview-7.15.93]

Lupita's vision of relationships with men was tangled in hatred and abuse. She seemed to believe that getting into an abusive relationship with a man was inevitably the norm, but, unlike her sister, she did foresee a way out of the situation:

In a way I kind of feel hatred toward men because of what I see and what I hear, but just say I was getting beat up by a man the more he hits me, the more I'll hit the man. I'll be kind of scared of him, just like my sister. In a way she was... okay, right now she's pregnant and the boyfriend went to Mexico. And my mom told my sister to leave him, but she didn't want to listen because she loved him, or whatever... I don't believe it was love, I think she was kind of scared of him...Well. I kind of say if I ever be in that kind of position, the first hit, the first divorce. And that's it. I don't want to get married no more.

[Lupita-Interview-7.15.93]

Lupita believed it was fear—disguised as love—that bonded her sister to an abusive man: "I don't believe it was love, I think she was scared of him." To overcome this kind of situation, Lupita put herself in her sister's shoes and called upon character, physical strength, and determination to resist abusive men. The picture she portrayed might appear hopeful in the sense that she envisioned the courage to face inequality and escape from it. However, Lupita's visions of resistance to the institution of marriage--the second time around--leaves me with serious concerns about the deterministic views of gender she used to inform her outlook on the future. I am concerned about the assumption that her womanhood is determined by her relationships with men; it worries me that she does not foresee any other form of social organization besides life by the side of an abusive man or life assuming the responsibility of taking care of children. I am also concerned about her assumption that women take care of children, while men escape this responsibility. Additionally worrisome is Lupita's naive trust in her individual ability to escape institutionalized power inequalities.

There is much to be said about Lupita's intricate stories which invariably raised a complex set of social issues connected to her views on multiple identities shaping her past,

present and future life. I am struck by the pervasive strength of gendered/classed positions reproduced in her tales about a future that has not even begun:

Lupita: I might run into a man, or stuff like that, and there's no reason why women... I don't want to marry law men, I want to marry men that builds things, that construction or fixes cars, stuff like that. That works in Oldsmobile or Saturn. Because I would never want a man that works in an office. Because, I don't know why, I like, um, I don't want that person to get dressy a lot, you know? I want them to wear clothes, you see the clothes I wear, I like them to wear clothes that I wear, you know. I want to wear... loose clothes.

[Lupita-Interview-7.15.93]

A marital relationship with a working class man, one who does physical work and wears loose clothes shaped the ways Lupita constructed an image of her future life. Constrained by the belief that she will spend her life next to a man who builds things, not "law men," not someone that "works in an office," Lupita constructed a self in this narrative, tied to a class-gendered system that reproduced her present location. She did not foresee becoming part of a professional world of ties and suits, but much rather find the man of her dreams within the boundaries of assembly lines in the automotive industry.

Constanza: What do you want to be when you grow up?

Lupita: I don't know, I want to help people in a way. In a way I can never see myself working at a job in a desk area. I don't know, I just don't want to. I wanna... I don't know. I just want to help people. You know, help them get clothes, help them get jobs... I was thinking of being a lawyer but then you have to go, you know, law school... like three years. People say that, 'Why don't you, just stay, like a secretary.' I don't want to be a secretary. I want to be a person who does stuff like work in the fields, maybe, you know, just work. You know, physically, not mentally.

[Lupita-Interview-7.15.93]

Lupita's blurry vision of a future that might lead her to become a secretary or a lawyer did not communicate a passionate outlook on a professional life. Even though she clearly identified a desire to help people, she marked a distinction about her preference towards giving help involving physical work, as opposed to the kind of help that requires "mental" involvement. Her views of the future were tied to her membership to a class

group that performs physical jobs, and as we shall see in the following excerpts, to an ethnic/racial group that she identified as Mexican:

But I'll say like one out of five Mexicans they go to college because they believe they want to make it to the top instead of the White people. The way I see it some Mexicans should stand up because you only see Negroes or White people on the commercials and I think they should have more Mexicans...Some Mexicans, I think they [employers] are kind of prejudice, though. Like me, the light-skinned Mexican, I guess I could get a job.

[Lupita-Interview-7.15.93]

By placing Mexicans in a position of inferiority in relation to "Negroes" and White people, Lupita made sense of college enrollment. Mexicans, she seemed to be claiming, are driven by a desire to become better than Whites or "Negroes." Later, when she spoke to me about Mexicans as a group with particular educational goals, Lupita added an important insight that fits popular images of Mexicans who do not move beyond high school educational levels. She said most Mexicans do not pursue college degrees: "Some people just don't want to go that far. Some people say it's too hard." I read these words as a way of saying that Mexicans are at fault for not willing to go far. However, Lupita also asserted: "Mexicans are real cool, they are the best and they work very hard," although "they don't want to try all the way." [Car Talk-7.26.93]. With these assertions, Lupita brought to the foreground a perplexing paradox concerning the lived experiences of Mexican people in the U.S, that in spite of their hard work, still a large number of Mexican immigrants remain at the bottom of the socio-economic ladder.

Dislike for school was one of many themes that ran through Lupita's stories about her educational opportunities. Good academic skills were not part of Lupita's self-portrait. At the beginning of the school year she recalled having a G.P.A.(Grade Point Average) of 2.3, and unlike other girls in our group, she did not seem concerned about raising her average. Lupita's narratives about school experiences were seldom about academic issues concerning her participation in science. Instead, they were often informed by an awareness of racial discrimination which she described in situations like the following:

You say a Mexican person needs help in this one problem and they ask the teacher to help them. The teacher says: "Well [pause] Wait a minute." And she's not doing

nothing she's just seating reading whatever and then a White person says: " Oh I need help" or whatever the White teacher will help the White student and then the Mexican person will say: "Oh forget it, she don't answer me" and then he probably get the wrong answer or something like that.

[Lupita-Interview-7.15.93]

The theme of racism also played out strongly on one-on-one interviews and during a group conversation when we talked specifically about women and minorities' participation in science:

Constanza: So how are schools involved in this? Are schools training you to...to be scientists, or helping you to become scientists in any way?

Selina: Yeah, by teaching us science.

Dominic: Uhm-hum.

Constanza: Are they...are schools contributing that you don't become scientists or you don't get good grades in science or you don't participate in science in some way? We've lost Lupita now.

Lupita: Yeah. What was the question?

Constanza: Does anything that happens in schools turn you down in terms of how you might become a scientist or involved in science?

Lupita: Sometimes the teacher's attitude, like...as I said before, they have to be more, they have to be involved with the subject, and they have to be involved with the students. Like, you know, they like the, the subject that they're teaching, but they, they should like, teach what they know, to all the students.

Brought into the realm of school, Lupita framed the issue of being marginal to science as a consequence of a teacher's attitudes towards students of color. In her narratives, she marked her race as a barrier and a shaper of interactions with a teacher with whom she had the following exchange:

Lupita: I don't know. Sometimes I don't...I think the White people think that, I'm not trying to just pick a race but sometimes [they] tell "Go sit down," I say well, "Don't yell at me," you say, "What was this?" And I say, "Well, what was that," and she like, she looked at me and start, and I said, "Don't be looking at me evil, you know," she said "Well, then you go to the office." And I said "Well." I told Mr....Mr., and he would like, "[It was] wrong for her to yell at you, cause you didn't do nothing wrong," I said, "Yeah." I guess he talked to her. I don't know.

Constanza: And do you think that that has anything to do with you being a woman or being...Hispanic?

Lupita: I don't think it matters what...you know, what sex it is, but, I think it matters what color. Okay, cause, you see, before I came, before I went up there, you know, there's all these White people, and Puerto Ricans, I guess, or Chinks, I don't know, they were all up there asking her questions, and I don't know why it had to be me, but I go up there, and she's like, "Well, go sit down," you know? And I was like, I got mad, so...

[Conversation-12.10.93]

I walked into Lupita's classroom to observe how she participated in science a few months after our conversation in December. While I observed Lupita, I was interested in the forms of engagement she showed in class. I will focus on one particular set of observations and teacher's comments regarding participation which struck me as relevant to a discussion about gender, class, ethnic and racial identities, and students' encounters with science. On this occasion, the students were setting up an experiment on motion and forces. Lupita wrote in her journal: "How can I construct a contraption that will roll at least 3 meters forward?" [Lupita-Journal Entry-Undated].

Lupita chose two girls to work on this experiment. Both of them were dark skinned and one had a Spanish first name. Interestingly, most students selected people of the same racial group and the same sex to work in their smaller groups. However, a few mixed groups along the lines of race were integrated by Mexican and White or Mexican and Black students. In Lupita's group, the girls took different roles. While the others designed and tried out their "contraption," Lupita took the role of secretary. She wrote diligently and worked on a detailed drawing. She said out loud: "I am writing what she is doing." Then she read from her journal: "She used two stools or whatever you call them...and I'm just writing what she did." While the teacher moved around the room monitoring the students' activities, Lupita continued to draw. Lupita stopped writing when her teacher, Ms. Saunders, approached her desk, looked over her shoulder and stated: "The picture you need to draw is a picture of your contraption. You have your conclusions in the beginning, conclusions come at the very end." When I looked at Lupita's drawing I realized she had been working on a detailed sketch of her teacher.

[Lupita-Fieldnotes-5.5.94]

The modes of participation that Lupita displayed during my visit—writing copiously and neatly, and taking the secretarial role—seemed to match her notions of "mental" work she described in our talk about the future. During that interview the previous year, Lupita had manifested a preference towards physical, rather than mental, office, secretarial work. Later, when we talked about my observations in her classroom, Lupita commented that she

took on the role of secretary because "I do not like wheels" and "I did not want to mess up." Both comments suggested that a "hands-on" activity does not necessarily trigger the dispositions towards inquiry that we would like to see in science students. Apparently, Lupita's notion of participation was constrained by a fear of messing up and a dislike for wheels. But in light of the previous interview and her latter comments, I also believe Lupita's attitudes towards science were informed by a notion of "good student," she was displaying for me. Even though Lupita's limited participation and her misplaced focus of attention were both disturbing to me, Lupita saw herself as a competent science student, someone who had "done the work" and "written down the hypothesis and conclusions." Interestingly, on that same day, I shared with Ms. Saunders my concerns about the limited modes of participation I had observed in Lupita and asked if this was typical of her. Ms. Saunders shared with me her perception that Lupita was participating much more in class since the previous year, and even suggested that Lupita's increased level of involvement could be related to her participation in this dissertation study [Ms. Saunders-Interview 5.5.94].

When I learned that Lupita's limited and sidetracked ways of participating in science class were satisfactory and even welcome, given the previous pattern of disengagement she had displayed earlier in the school year, I became more aware of the structural constraints that limit her opportunities to develop her full potential. It struck me to see how Lupita could make it through school as a peripheral actor, marginally involved, and yet wear the label of a "good student." If school represented a place where the kinds of "mental" work she displayed for me became satisfactory standards to succeed, I can now see how her student identity shaped the ways Lupita saw herself in the future. I remember Lupita's remarks about her preference for a future in some kind of "physical" as opposed to "mental" occupation. If Lupita's notions of "mental" work were informed by her notions of good student she displayed for me on this day, then it is understandable that she had developed a negative response towards life behind a desk in a "mental" occupation.

The narratives in this portrait talk about ethnic, racial, class and gendered systems of oppression which shape the ways Lupita experienced schooling and the directions she highlighted to build a future. They also talk about ways that students' identities shape their responses to schooling and their future expectations. These narratives highlight the structural inequalities which constraint Lupita's experience, but they also mark roads of possibilities for social change. I find it particularly encouraging to learn that the construction of ethnic identities does not need to be bound by stereotypical and essentialist notions of identity which leave little room for change. Listening to Lupita, I learned about the ways her social membership to the Chicano movement, which grew over time, was transforming derogatory notions of identity and giving her a sense of self esteem and pride. Hopefully, this or other powerful social affiliation will give Lupita an increased awareness of the ways her gender identity can change within the Mexican household, and the ways she can transform her "student" identity to challenge notions of a "good student" that reinforce marginal positions in the classroom.

The narratives in this portrait were drawn in different contexts, from multiple sources including interviews, informal one-on-one conversations, journal writing, fieldnotes, and group conversations. The richness of Lupita's stories can be highlighted by the various methods I used to capture her voice in our weekly encounters. The combination of data sources allowed me to reveal Lupita's multiple voices, and the multiple ways she viewed her class, race, gender, generation and culture constraining her ability to cross the borders and gain full access to the same opportunities of any other American citizen. In the next chapter, I will focus on the methods and methodologies that inform this dissertation study.

Chapter 3

VOICES, SILENCE, AND IDENTITIES IN NARRATIVE INQUIRY

In the previous chapter I identified three central guiding themes emerging from the work of feminist women of color. First, I highlighted the need to bring to the center of feminist studies the experiences of a diverse pool of girls like the participants in this dissertation, representing social locations other than middle class and white. I also spoke about the need to analyze and interpret women's experiences within interlocking systems of oppression. Third, I briefly introduced the constructs of voice and silence as conceptual frameworks to locate my work within a tradition of research that seeks political action and social change. In this chapter I return to the themes of voice and silence to talk about the enactment of this research study. I begin with an overview of narrative inquiry, a tradition on which I ground this research study's methodology. I continue with an analysis of the concept of voice in narrative to unravel the meaning of voice as a construct to locate myself in relation to the people I was studying. The last section in this chapter focuses on the process of doing narrative inquiry represented in three sequential stages: beginning, living, and writing the story.

I will start with an anecdote which captures a quest for connecting the subject matter of science, the focus for this dissertation study, and the theme of identities. This is a story I heard from Paul Hurd, a leading researcher in the field of science education whose words I find most appropriate to direct our attention towards issues of method and methodology in doing research with people who have been at the margins of science:

What I did was to hire me a taxi driver, he turned out to be a big guy, about 300 pounds. He occupied the whole front seat of his cab, a good natured guy, I said: "I'm gonna hire you by the day," we agreed on the price, and I said, "You drive me to junior high schools. And we're gonna need some candy bars and we're gonna sit on the curb and then you get these kids to talk to me." They're not gonna talk to a white man because you're either a police officer, or from the health or welfare agency or something, you're not gonna do them any good, especially if you're white. So, he agreed and every day I changed to a different junior high school. We sat on the curb outside...I said, "Why aren't you in school," they said, "We don't

learn anything." "What do you mean we don't learn anything?" " It never tells you anything about yourself."...It's true. Isn't it?

[Hurd-Interview-1992]

In his lifetime, Paul Hurd has promoted, tailored, and helped to implement science education reforms that come and go in waves, leaving a number of Americans outside the realm of science. I treasure Dr. Hurd's insights as he talked to me during an interview about his life, for his words exemplify a commitment to the belief in research that seeks to listen to the voices of students who have not been well served by schools. Furthermore, his anecdote raises a fundamental issue in science education, the troublesome assertion that schools are places where students do not learn about themselves.

The story I heard from Paul Hurd back in 1992, before I began this dissertation project, left me pondering over a handful of meaningful questions: Is it true that science never tells students anything about themselves? Is this the reason why so many "minorities" and girls are not attracted to careers in science or even to science related activities within schools? These questions pointed once more to the need of placing the spotlight on the experience of girls of minority origin and bringing their voices to the attention of researchers in science education. Such an attempt required the creation of a space where their voices would not only be elicited, but also heard. To borrow Dr. Paul Hurd's imagery, I had to create moments "sitting by the curb" in the company of students who would talk to me.

Voice in Narrative Inquiry

How does one create spaces for the voices of people who have been described as silenced and marginal in education? I was particularly interested in getting a sense of the ways the participants in this study constructed images of themselves as people who participated in or were alienated from school science. The tradition of narrative inquiry seemed to offer a number of advantages to pursue my goals.

The work of Connelly and Clandinin (1990) offered to engage in the process of doing "inquiry into narrative," a study of the ways people construct themselves in stories:

The main claim for the use of narrative is that humans are storytelling organisms who, individually and socially lead storied lives...education is the construction and reconstruction of personal and social stories; teachers and learners are characters in their own and other's stories. (Connelly & Clandinin, 1990, p. 2)

Students' constructions of self in stories give us access to school experiences as characterized by the actors who live them, as opposed to constructions which strictly respond to research questions. This strength of stories, that they capture the tellers' web of interconnected experiences, has given them a place in educational research. As Kathy Carter (1993) asserts,

Stories became a way, in other words, of capturing the complexity, specificity and interconnectedness of the phenomenon with which we deal, and, thus, redressed the deficiencies of the traditional atomistic and positivistic approaches in which teaching was decomposed into discrete variables and indicators of effectiveness...The special attractiveness of story in contemporary research on teaching and teacher education is grounded in the notion that story represents a way of knowing and thinking that is particularly suited to explicating the issues with which we deal. (Carter, 1993, p. 6)

In spite of criticisms of narrative for its focus on the individual, narrative inquiry may also address cultural and sociological issues. Through narrative analysis, researchers can move back and forth from the individual as a category of social analysis to social groups. In his introduction to *Narrative Analysis*, Martin Cortazzi (1993) claims,

Narrative analysis can, [therefore] be seen as opening a window on the mind, or if we are analyzing narratives of a specific group of tellers, as opening a window on their culture. (Cortazzi, 1993, p. 1-2)

Anthropologists and sociolinguists, for example, study the cultural patterning of customs, beliefs, values, performance and social contexts of narration (Cortazzi, 1993). Perhaps this is one of the most appealing strengths of narrative as method and methodology in educational research, that it offers a means to gain access to both collective and personal experience. This strength of narrative has been particularly fruitful in educational studies that focus on teacher life histories (Connelly & Clandinin, 1990).

Another appealing benefit of narrative analysis is its interdisciplinary quality. Speaking to this strength, Cortazzi (1993) highlights the need for educational researchers "to use the knowledge, draw on the insights and apply the models and findings already

obtained and developed elsewhere..." (p. 2). Following this direction, I searched multiple resources for guidance in the process of selecting and analyzing the narratives that became the core of this study. In the previous chapter I spoke about the influence of feminist theory and literary analysis in the process of analyzing and selecting narratives.

The grounding of a study in narrative inquiry required that I provide spaces for stories. These spaces included interviews, informal conversations, and journal writing, where participants defined themselves as subjects with specific qualities. To gain access to stories that speak about identity I asked participants to describe themselves and listened to the categories of nationality, generation, class, sex, ethnicity, race, and gender as characterized by the participants in their definitions. I also listened for participants' own categories, which included personal, physical, and intellectual qualities like being "smart," physical attributes like "height," and relational qualities like "nice," "good friend," "daughter," and "student." During our conversation sessions and interviews, stories about identity were elicited both in response to direct questions and also as unsolicited narratives of experience. These stories were particularly frequent and spontaneously elicited throughout our group conversations. By contrast, participants seldom offered unsolicited stories about science related issues or activities and did not identify themselves as scientists unless the question was raised by the interviewer. This set of issues drew me towards a closer analysis of the enactment of conversations which led me to inquire about the process of telling stories within conversations: Why did science appear to be absent from our conversations? When and how did science come into our conversations unsolicited? When and how did it enter our conversations through my direct intervention?

The narratives that became the core of analysis and interpretation in this dissertation study were embedded in conversations and interviews which gave them a context for interpretation. Jerry Gale's (1995) insights offered helpful guidelines to reflect upon this issue:

A "good" narrative will have salience, meaning and integrity to the listener/reader such that he or she may then incorporate it into his or her own broader narrative of

self-identity and self-action. I also would suggest that it is in each person's telling of his or her stories that they both create and maintain their moral actions and continuity of identity. (Gale, 1995)

My interpretation and selection of the narratives as performative acts within our conversations drew attention to the purposes of narratives and the role of audience in the construction of narratives. I listened to these narratives as accounts of experience, but also as instructions of how to act and relate in life according to self definitions and ascribed categories of identity.

Current enthusiasm for narrative research is connected to political projects (Casey, 1995). By providing a space for stories, researchers place narrators and their experiences at the center of analysis. In this way, participants are empowered to challenge and disrupt established social relations (Hopkins, 1994). Hope for empowerment is certainly a desirable outcome of doing research with the "silenced." I share the goal of engaging in political action towards social change, although I am more cautious about the impact of storytelling as a movement towards transformation social relations of power. I will pause here to address the issue of political intentions in narrative inquiry, in particular when those intentions are represented in the metaphor of voice. In the following section I unravel the relations between the concepts of voice, silence, and audience as interconnected pieces in the formulation of strategies that lead to social change.

Whose Voice Is It Anyway?

The multiple uses of the concept of voice in current discourses in education point at the need to clarify the political agendas in the process of conducting research with people who have been at the margin of educational endeavors. In this section I intend to clarify my role as a researcher creating spaces for voice. I frame my reflections around a question which encompasses a broad range of issues regarding the process of constructing spaces for voice. As this study progressed, the concept of voice was problematized by the presence of students whose voices I was supposed to seek, find, strengthen, and represent in writing. The presence of students in the process of doing narrative inquiry increased my

awareness of power relations entailed in the notion of voice. They raised the issue of truthfulness in my claim that my dissertation represented a space for *their* voices, when my agenda was clearly the overriding force in our talk. Whose voice was it anyway? This question pointed at the heart of the matter in doing studies and writing texts about voice and called for an analysis of epistemological understandings and political commitments in research studies on voice.

The term voice is used in education literature to recognize absence of significant numbers of people as creators, producers, constructors of knowledge. Voice is used as a construct to study the silent, a research category that includes ethnic and racial minorities, women, the poor, gays and lesbians (Lincoln, 1993). Voice is a call from feminists and critical pedagogues to place the spotlight on a world that has long remained silent to scholars and practitioners in the field. But a seemingly widespread use of the term voice in academic circles might give the illusion of unified understanding. However, images of voice in the literature connote diverse meanings. Expressions like "giving voice" (McElroy-Johnson, 1993) for example, suggest an uneven relation between a passive voiceless subject and an active donor. The action of giving implies the presence of a person in a position of power who can give or take away voice. But the concept of "giving voice" is quiet problematic, for it could imply that participants did not have a voice until they were heard by a particular audience. "Searching for voice" (Cavazos, 1994), on the other hand, connotes the presence of voice, which a listener intends to find. Even though both phrases make reference to the relational nature of voice, the qualities of this relationship are strikingly different. These qualities in turn, shape the stories we tell about voice. A researcher, teacher, parent, or educator who "gives voice" might focus on his or her actions and the means by which the powerless can be empowered. By contrast, the person in "search for voice" might focus on the act of listening and preserving the authentic qualities of the voices to be discovered. It is this relationship between researcher and researched and

the political intentions of the researcher that shapes the ways we conceptualize and represent voice.

The construct of voice and what is often viewed as its counterpart, silence, are instrumental in my definition of location in terms of the ones I am studying. By virtue of my gender and ethnic background, I shared with participants in this dissertation study an "Otherness." We, Hispanics or Latinos, have been objects of study, characterized as passive recipients of the actions of people with more power. We are viewed as the minorities, the marginalized, disenfranchized, the racialized, and silenced. A study of silenced people is a study of otherness. It highlights the ways people have been colonized, named, and tailored by the other. But this focus on otherness misses the qualities of self that revealed themselves in the womb of our conversations and interviews. I was often reminded throughout this research process that silence is confused with lack of audience. I listened to the so-called voiceless and I heard girls actively constructing meaning, contesting power structures, and critically analyzing language. Contrary to the imagery of silent people, some girls, in particular those who claimed the label Chicana to identify themselves, were actively involved in community organizations where they had a voice and a vote. During the year when I carried out this dissertation research, one of these girls made a public statement on the radio protesting against a broadcast of negative stereotypical images of Chicanos. Were these girls really voiceless? Or were they called voiceless because their thinking lacked political power in some circles?

The words of Evey Chapa and Armando Gutierrez in *Chicanas In Politics: An Overview and a Case Study (1977)* ring true:

Chicanas do not believe that the image which has been imposed upon her by the academic community is valid...Chicanas then are rejecting the long imposed stereotypes. Further, Chicanas are beginning to offer alternatives to these stereotypes based on their own perspective within their own cultural context. The alternatives are emerging in the form of research efforts and published materials about Chicanas, by Chicanas. (p. 145)

I do not intend to represent the girls in this research study as silent, but rather as individuals who have been silenced in some contexts, deprived of voice without their

consent. They have been ignored by those in power because their points of view are either disregarded, difficult to access, or marked by social stigma (LeCompte, 1993). In my position of researcher, I was instrumental in searching for an audience of educators that would lend an ear. In this sense, this research study can be portrayed as an avenue to "give voice," only if "giving voice" means to have a say among those for whom the particular group of people participating in this study have long remained silenced. My intention of searching for an audience among science educators and feminists is reflected in the strategies I used to provide space for voices in interviews and conversations that focused on questions of interest to feminists, science educators, and teachers, the groups I envision as primary audiences for this dissertation.

The issues raised above direct the phenomenon of voice towards the presence of an audience. Is there voice when there is no one to hear it? How does an audience shape the voice of a speaker and the stories she or he tells? In this dissertation I am taking the position of mediator, I am both audience and author. As a mediator between participants and audiences, I had an impact on the stories that became the core of this study. In doing research with the so-called "silent," I encountered issues of representation which are tightly linked to our identities and our location as raced, classed, gendered individuals. As one of them, a Latina, I can be perceived as representing a group of people and sometimes even taken as their spokesperson. However, I am aware that neither our ethnicity, gender, class, or race can be equated. Our histories are strikingly different and we identify and relate to the world in different ways. They are young adolescents I have been around for four decades. Their identities as Mexicans, students, daughters, friends and sisters are the most salient, while I emphasize mine as Latina, mother, teacher, student, wife, and researcher. Our worlds are distant, yet close. In my writing, I wanted to bring these worlds together, while keeping them apart. I grappled with issues of authority, questioning my role as constructor of this written text and my right to author someone else's story. I questioned whose voice I was representing and which voice is carrying over in this text. Throughout

the process of shaping this study and writing about it, I felt impelled to revise the notions of voice informing this work and to redirect my queries towards questions of audience: Who was speaking to whom, who was listening, and why these girls were portrayed as silent?

As an audience who selectively listened and transcribed the stories I heard, I intend to reveal my own story so the reader gains access to criteria that informed my decisions. Throughout the text, I do not leave the participants' voices standing alone, for that would misrepresent the relational nature of our speaking and listening together and it would undermine the impact of their voices on mine and the power of my voice on theirs. As a member of an audience who listened to Chicanas' stories about school, I felt transformed by their voices. As our relationships grew in the context of our weekly conversations, to some extent, their voices exercised the power of transformation, a political dimension of voice that is often problematic. For me, this transformation became evident in shifts of direction for this research study. In hindsight, I interpret this transformation as a process of decentering science as I once conceived it, in terms of its epistemological assumptions, its content and evaluation. Instead, I located the girls at the focus of this study and opened my frame of mind to hear their understanding of science as a piece of a very complex web of life. In my writing, I also experienced significant change by growing from documenting and describing situations to becoming part of the narrative, giving myself a voice that draws attention to my story.

For some girls the experience of transformation also manifested itself in giving opinions, sharing their thoughts and views about the world, and also in the development of a sense of self that could change the world around them and overcome silence. In this sense, voice, as personal intellectual and ethical development (Belenky, Clinchy, Goldberger, and Tarule, 1986) was also experienced as a process of growth within our conversations.

I have suggested in this section that the concept of voice guiding this study is not a unilateral phenomenon, but rather a relational process involving speakers and audiences. In Deborah Britzman's words,

Voice suggests relationships: the individual's relationship to the meaning of her/his experience and hence, to language, and the individual's relationship to the other, since understanding is a social process. (Britzman, 1991, p. 23)

Voice is located within a process where speakers and audiences become active participants with mutual rights and responsibilities. A lack of recognition of audience as an agent for voice disregards responsibilities towards the so called silent. This is one reason why, throughout my writing, I draw attention to the interactive nature of the process of constructing voices.¹ By relocating voice and silence in an audience's ears, I begin to examine ways by which people and institutions become deaf and misrepresent this condition as a failure to speak up and participate. In regards to this particular study, a focus on audience became a central piece of this theoretical framework to reflect upon silence, as a result of research practices that render silence, instead of eliciting voice. Who was the audience for the stories that constitute the core for this dissertation? This interesting question reveals a multilayered composite of potential readers of this dissertation and an audience for the narratives in our conversations and interviews.

In the construction and interpretation of the narratives that you are about to read in the pages that follow, I assume an interactive role. The narratives in this study should be read in relation to their primary audience, which included participants and the researcher. The context and purpose within the setting where they were constructed is relevant to their interpretation, but also, they must be read in connection to a broader social context. They were not solely directed to the readers of this dissertation, but to multiple audiences. It is important to note that in the context of debates about multiculturalism in the U.S., and a growing interest in increasing participation of women and minorities in science education,

¹ For example, I include my reflections on the content and process of carrying on conversations. In my writing I often highlight the ways my actions and my thinking shifted overtime, in response to a growing relationship with the participants.

this text could grab the attention of an Anglo audience spread across many disciplines. As one who wants to speak to a U.S. audience, while being accountable to a Latino audience, I am often in a position of conflict. With one foot in each world, I caution myself and ask, How is the Anglo audience tailoring my narrative and constraining the ways I represent voice? Am I overlooking the needs of a Latino, Mexican, or Chicano audience and focusing on Otherness instead of constructing selves? I believe this research study would have very different characteristics if it had been tailored exclusively for a Mexican, Latino, or Hispanic audience. This possibility of constructing a study for a different audience constitutes an interesting avenue for future research.

Meanwhile, suffice to say that I positioned myself between the participants in this study and an audience of researchers, teachers, educators, and feminists who are interested in exploring identities and science. In addition to becoming a mediator that searched for an audience for accounts of school experiences of adolescent girls of Mexican origin, I also positioned myself as audience and interpreter for their stories.

In the next section I will examine the approaches I used to "give," "search," "listen," and "interpret" voices and silences in this dissertation study. I move on to describe the strategies I used to elicit narratives and examine the contexts where the participants and I held our meetings. As a framework, I use the stages of beginning, living, and writing the story (Connelly and Clandinin, 1990). Throughout this description of methods I examine ethical issues entailed in the practice of naming, selecting, and telling stories about the "silenced."

Beginning: Weeding and Weaving

I often think of myself in relation to this study and the construction of this text as a weaver, as a spider who carefully produces a thread and then connects it to some hidden pattern. But I hardly ever see myself as a weeder, one who pulls out life to allow plants with better reputation to grow and bloom. Think about all the values underlying the act of weeding out the dandelion so the beauty of the rose can reach its peak.

In this dissertation, I certainly did not conceive a role of weeder for myself. But early on, I was confronted with the realities of inclusion and exclusion, segregation and desegregation, silence and voice. I had to make decisions that called me to recognize my positions of power and control over the participants in this study. I asked, Where did I really stand as a researcher?

The act of doing research about Others is a practice grounded and sustained by unequal power relations between the researcher and the researched. It is to these positions of power that feminist researchers in fields like anthropology, philosophy, and education are drawing our attention (Lugones, 1990, 1994; Maher & Tetrault, 1993, 1994; Visweswaran, 1994). Feminist scholars are raising ethical issues and representation and epistemological concerns which acquire even more complicated dimensions when research involves people who have been silenced (McLaughlin & Tierney, 1993).

What's In a Name?

To begin, I faced a revealing dilemma which, in a way, paralyzed my efforts to write about this dissertation study: What name would I give to the participants in this dissertation? Aware of my inability to explore fully this issue until I was in the process of doing the study, I answered in a generic way, using the narratives of identity that have inscribed me as an ethnic individual. I used the terms Latina and Hispanic indistinctly.

The question of name was relevant for a number of reasons. One, because the name I gave to the potential participants in this group defined the boundaries for participation. It had an impact on the number and kind of volunteers I could draw to this study. But the question of name was also an issue of voice. A diversity of labels is used to refer to people with ethnic backgrounds broadly defined as Hispanic. These include Latina, Chicana, Mexican, and Mexican American. Claiming a label for the participants even with the intention of including them in this project clearly meant silencing their voices. However, it was not until the process of narrative inquiry was in its course that I began to explore the issue of name as part of this research.

I first selected the term Latina as a descriptor for the participants in this dissertation study to convey two important ideas. One, that I was interested in a broadly defined ethnic origin, specifically, people of Latin-American origins; second, that I was also interested in carrying out a study that focused on girls' experiences.

The U.S. Census (1980; 1992) uses the term Hispanics to identify all Spanish-speaking and/or Spanish-origin populations in the United States. The fact that the term prevails in the mid-west state, where I conducted this study made a case for using it as a language resource to locate students of Spanish descent in school settings. As I discovered when I first started making contact with students, the term passed unquestioned by teachers, school, and state administrators alike. In my letters of presentation to teachers, parents, and school administrators, I preserved the terms Hispanic and Latinas interchangeably, to prevent exclusion of girls who use either term as ascribed or self chosen identity.

However, the term Hispanic, a U.S. invention, represents an act of power over a group of people whose identity has been ascribed by a government agency, rather than a claim for self identity. The term Hispanic also fails to represent the diverse composition of a large group of people whose origins evoke a wide range of geographical areas, cultural and racial backgrounds, and multiple languages. Furthermore, for the purpose of this dissertation, the label Hispanic was inappropriate for the term did not communicate the idea that gender identity was central to this dissertation. The label Latina, on the other hand, conveys gender identity, but still at the expense of concealing diversity and imposing a European label on people whose life experiences have been centered around the U.S and Mexico.

To address the question of ethnic label, I asked the participants what name they preferred to refer to their ethnic origin and also asked how they were identified in school settings. Regardless of the number of generations in the U.S., most girls preferred to be called "Mexican." While most of these girls were recognized as Mexicans among friends,

in schools they were also labeled as Hispanics or Mexican-Americans, this latter distinction often criticized as a marker of difference in opposition to the Anglo experience.

Another recurrent label among some of the participants was Chicana. This term has its roots in the Chicano political movement emerging in the late 1960s that struggled against the historical oppression of people of Mexican descent in the U.S. (de la Torre & Pesquera, 1993). Chicano ideology traces Chicano oppression to the colonial domination of Mexican-Americans following the annexation of Northern Mexico by the United States after the U.S.-Mexico War of 1846-48.

As part of the process of colonial domination, Chicanos were limited in their access to education, employment, and political participation. Thus, race ethnicity defined the life chances of Mexican Americans rather than individual merit. Cultural differences between Anglos and Mexicans became the ideological basis that legitimized the unequal treatment and status of Mexicans in the United States. Ideologically, Mexicans were viewed as intellectually and culturally inferior....The term "Chicano" arose as the symbolic representation of self-determination. It conveys a commitment to politically struggle for the betterment of the Chicano community. (Pesquera & Segura, 1993)

Within the group of participants, there were three girls who chose the name Chicana as a descriptor of their racial/ethnic background. Two of them, Alejandra and Dominic, recognized in their self definition as Chicanas a process of political awareness fostered at home and their involvement in community groups. Lupita, the other participant who claimed Chicana as a self-chosen label for her ethnic origin, was influenced by the use of the term in popular media, where it symbolized power and pride.

As a result of this dissertation study I am often asked what is the appropriate way to address a person of Hispanic ethnic origin. Perhaps I am expected to respond with a simple blanket statement to reassure speakers that they are using the "politically correct" terminology. This study has taught me that individuals define their membership to a particular ethnic group with varying levels of awareness. While some girls accepted any label uncritically, some had developed a political stance towards their life experiences which informed not only the ways they viewed themselves as individuals, but also as a collectivity.

The question of ethnic label goes beyond respecting an individual's self denomination. It is a question with collective consequences and political underpinnings that need to be differentiated. To address someone's ethnicity, I suggest that we become educated in the ways ethnicity labels serve as markers of difference. It is not enough to prescribe rules for proper use of labels, it is more important to reflect upon the context where difference needs to be acknowledged and consider the political implications of re-asserting identity boundaries.²

Throughout the process of living this dissertation I changed the ways I labeled ethnic identity following primarily the participants' self definition. I used Chicana, Hispanic, Mexican, and Mexican American when these terms were selected by participants during interviews and conversations to identify themselves individually. When I referred to the group of girls as a collective, I adopted the terms "Mexicana" and "Chicana" to give recognition both to their gender and ethnic origins.

Gaining Access

To identify potential participants I first established contact with "Latinos"³ in the city of Cedarville, some of whom are community leaders, "minority" program coordinators, school administrators, and teachers. These initial contacts gave me access to summer and after school programs in Cedarville. I first contacted some of the participants by approaching them directly while they participated in one of the summer education programs. The rest of the girls were contacted by mail, by word of mouth, or, by telephone communication. By far, word of mouth and personal contact turned out to be the most effective ways of reaching participants.

² In *A History of the Mexican-American People*, Julian Samora and Patricia Vandel (1993) address the question "What's in a Name?" from a historical and cultural perspective. The authors make important distinctions concerning different meanings of terms like *Mexicano* in different areas of the United States. The term *Mexicano* when used in English, is considered to be quite derogatory, for example in areas of New Mexico, Arizona, Colorado and California. The authors' prediction is that the term "Chicano" will become the most popular to describe the Mexican-American population.

³ I am using the term "Latino" as a collective label representing people of Cuban, Mexican, Puerto Rican and Guatemalan origin.

By the middle of the summer of 1993, I had contacted a total of fifteen girls who shared interest in this project. After a first encounter with all fifteen potential participants I carried out two interviews with ten girls. Five girls who withdrew their names from the first list explained they had other commitments which did not allow them to engage in another after school activity, or they did not get approval from parents.

Who Was Included?

The process of selecting participants was informed by other criteria aside from searching people of Spanish/Mexican origin. The writings of women of color oriented the process towards a selection of girls whose identities reflect multiplicity of voices and experiences. In thinking about multiple voices and identities I became aware of the need to include girls from a wide range of socio-economic backgrounds, diverse number of years of residence in the U.S., with diverse interests in science and educational goals, diverse family educational background, and with a wide range of school levels including middle school and beginning high school.

Reducing the group of participants in the study was not just a self selection process. Several factors influenced my decision to limit the group of participants to a total of seven. Primarily, the logistic constraint of providing transportation for participants, and more importantly, I was guided by researchers previously engaged in narrative inquiry (Cavazos, 1994) to limit the group size. This I believed would enhance the chances of all voices to be heard. I was also influenced from the start by evidence of interpersonal conflicts which had emerged at the migrant education program. Magda's participation in the group precluded the participation in our conversation sessions of some girls with whom she had a fight that summer. I decided to invite Magda to join the group, even though this choice would impose constraints on other girls' participation. Because Magda offered a unique position as recent immigrant to the U.S. I saw in Magda a "newcomer," whose narratives would help us compare and contrast the diversity of experiences in our group. I was also

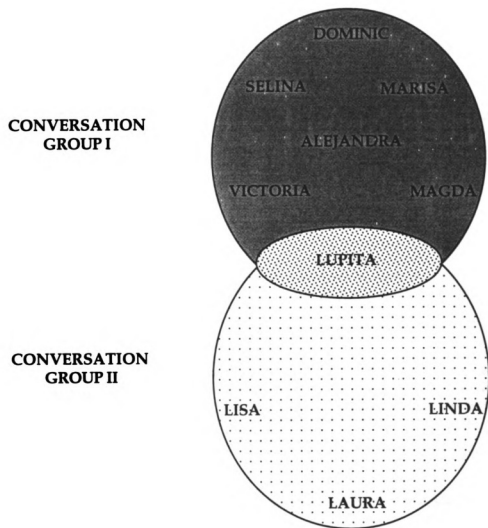
interested in Magda because she brought an overwhelming and challenging silence to a study where voice was a central issue.

The composition of the final group was Magda and Lupita, two middle school students who participated at the migrant education program; Alejandra and Dominic, two high school students who were contacted through my Latino friends; Victoria and Marisa, two middle school students who participated in a science after school program; and Selina, a middle school student who joined the group towards the end of the sessions. All seven participants attended school in the same school district.⁴

After our first meeting I received a phone call from Linda, one of the girls in the migrant education program, inquiring about our meetings. Her call posed an interesting set of questions. Her request struck me as a reminder of my "weeding" acts. Linda placed me in the position of explaining why she and her cousins I had interviewed at the summer education program had not been included in the conversation group. Linda also reminded me that the girls at the migrant education program had expressed an interest in our meetings and I was dismissing them. After several considerations, i.e. group size, transportation, and the history of conflict between Linda, her cousins, and Magda, I decided to create a second conversation group, separate from the first one. Conversation group II included: Linda, her cousins Lisa and Laura, and Lupita, who was also a participant in conversation group I. *Figure 3* represents the final composition of both groups.

⁴ In 1994 the district reported that 12% of their student populations was Hispanic, 1% American Indian, 5% Asian, 33%, Black, and 50% White. Note that the numbers correspond to rounded percentages. Source: Cedarville School District Report, 1994.

Figure 3
Conversation Groups



The bulk of the data included in this dissertation comes from conversations with group I. This selection implied leaving out a rich and interesting line of inquiry focusing on the experiences of three potential participants. Although this selection made this dissertation project more manageable, and allowed me to continue our meetings for a longer period of time, the benefits of extended meetings was done at the cost of weeding out a very interesting set of stories.

Living The Story

Scene from Summer Education Program

The building where the Summer Education Program was in session seemed dormant in the heavy, muggy air of this summer afternoon. I entered the elementary school where the program was housed to be greeted by the comforting sounds of Spanish voices floating down the hallway. I retraced my steps looking for Ms. Runner's classroom. A mixed feeling of fear and hope got over me as I recalled the comments given by her students two days earlier, when I told them I was conducting a study for girls only.

I remember feeling scrutinized by curious eyes that traced my figure from top to bottom while I walked towards the front of a classroom outnumbered by boys. Ms. Runner introduced me as a visitor and asked students to show their best behavior as they listened to me. I explained I was there to look for girls who wanted to be part of a study about minorities' participation in science. The boys' reaction did not wait: "Just girls? That's not fair," yelled one boy. But most surprisingly girls participated actively in what appeared as putting down their own gender identity. One girl turned around, pointing at a boy sitting behind her, and declared emphatically: "This girl over here wants to participate." The whole group burst out in laughter. The mockery continued among girls and boys, and made me hesitate to ask the crucial question: who was interested in participating in this research study. Instead, I decided to come back another day. On the way out I asked Ms. Runner if she would take volunteers' names for me.

[Fieldnotes-7.1.93]

This scene marks the beginning of my encounters with the participants in this dissertation study. Looking back at that day, I still feel the power of my emotions when I presented my project to students for the first time. Several thoughts take me back to this event. I dwell on it as a marker, a reminder of the obstacles to establishing trust and rapport for the purpose of providing spaces for voice. But more than a signal for initiation, this event brings to the foreground a number of concerns, dilemmas, and questions which I still ponder.

Purpose and Benefits

As this vignette suggests, I was an outsider in these students' lives. Even though I often pass as Mexican or Latina because of my looks and accent, in this location I clearly felt like "the other." My "otherness" was marked by my location as a speaker in front of the room, while everyone else facing me was instructed to listen. My "otherness" was marked by my gender, in a room outnumbered by boys, and my age, considerably older than most of my listeners; and my "otherness" was even more evident when I used the term "minorities" to describe potential participants in this study in a room where everyone was Mexican.

On the other hand, from my perspective, this first encounter represented connection with some of the students I was facing. By making this a study about girls, I connected my gender identity to some of the students in the room. In regards to our ethnic background I saw some threads of common cultures running across our lives. Given my knowledge of the culture of schooling in the U.S., given my life as a girl and woman, given my knowledge of the Spanish language and my connections to Latin America, I also felt like an insider to some aspects of these students' lives.

I recall feelings of fear that played out in my mind as hesitations and silences. There were issues of inclusion I left unattended. For instance, when I was challenged by the remark that this study was unfair because it was just for girls, I responded evasively. There were issues of language that slipped by without explanation. I used the labels "minority," "Hispanic" and "Latino" interchangeably, not knowing at the time that most of these young students called themselves Mexican. There were issues of purpose which left me wondering who would really benefit from this project. One boy summarized this concern by asking:

"Are they getting paid?"

This was not the first time I had been confronted with questions of purpose and benefit, or dilemmas of inclusion and exclusion. I am now reminded of Renato Rosaldo's (1989) words in *Culture and Truth*:

Social analysis must now grapple with the realization that its objects of analysis are also analyzing subjects who critically interrogate ethnographers-their writings, their ethics and politics. (p. 21)

A few days before my first encounter with the students in Ms. Runner's class, I talked to a teacher and community leader in the area, who, after an apologetic remark, explained her feelings of distrust towards researchers in general, and, in particular, towards someone trying to establish personal contact with Hispanic students for the purpose of talking about their experiences in science. Her premonition was that students would not participate in a research study unless they saw an immediate benefit coming out of it. I was not in the position of offering material benefits, except lunch at a local restaurant. Besides, I felt that this project's purpose would get diminished by assigning a trading value such as a free lunch or a few bucks in exchange for participation. I was deeply disturbed by the contradictions entailed in my efforts to respond to a most fundamental question: What could I offer that would benefit them?

Advocates of narrative modes of inquiry had laid out a number of potential benefits coming out of our conversation group, a space where girls would get together and talk about their experiences in school, and in particular the ways they experienced science. If we directed our conversations towards storytelling about episodes from their lives, these girls would find occasions to give form to chaotic experiences (Madeleine Grumet, 1988); develop their own voices (Joanne Cooper, 1991); enter into caring relations (Nel Noddings, 1984); and locate themselves in their own cultures (Mary Belenky, Blythe Clinchy, Nancy Goldberger, and Jill Tarule, 1986). There were also hopes for empowerment to change social relations (Hopkins, 1994) and, at the core of this inquiry, there was hope to develop what Peter McLaren calls "postcolonial narratives of liberation,"

to "contest claims to domination by groups on the basis of race, class privilege, and gender and other interests." (p. 218)

All of the above noble and exemplary academic endeavors might justify engaging in narrative inquiry. But, I wondered if these justifications were meaningful to the girls I was trying to bring to the project. How could I begin to explain these long-term potential benefits, when the circumstances seemed to call for a buck or a burrito?

Some of my questions were partially resolved in action. I learned from the "field," to use a term rooted in anthropological research traditions, that by placing the spotlight on girls, and excluding boys from this research project, I was setting up a stage that would allow a very different quality of interactions among participants. I made my second visit to Ms. Runner's classroom:

On my second visit to Ms. Runner's class I had a very successful experience. I met the group on the playground where boys and girls were playing basketball. When Ms. Runner saw me, she asked the boys to go in the classroom and the girls to stay outdoors with me. We gathered around a picnic table. In this setting all girls behaved differently. The yelling, the pushing and the mockery that was so evident on my previous visit did not dominate our talk. With a great sense of relief I can say that we had a conversation; we found a space where we could engage in dialogue, where several girls showed interest in this project and raised their voices to ask questions and even to contest boys' assumption that they should be included.

Even though boys were told to go back to their classroom, one of them stayed behind, eavesdropping and making disruptive remarks directed to our group. He repeatedly asserted he intended to get a skirt that would enable him to become a member of the group. Interestingly, none of the girls were wearing skirts that day. In response to his insistent interruptions, one girl replied, "It is like boys scouts junk where girls are not allowed. You do the same to us."

[Fieldnotes-7. 6.93]

In this different arrangement, where girls became the majority, it seemed as if their voices stood out and spoke up to preserve the space we had found under a small shelter in the wide open space of the school playground. This stage also served as a context where we focused our talk on many issues concerning the project, including the potential benefits for participants. Interestingly, none of the girls were concerned about material benefits and they all agreed that their willingness to participate was not attached to an almighty dollar.

Rather, their interest in participating ranged from expressing their opinions to having fun meeting other girls and escaping the obligations and constraints waiting for them at home.

At the offset, the potential participants and informants of this study asked for explanations about my intentions, my politics and my ethics. Their presence increased my awareness of my position as insider/outsider, Self and Other; researcher and researched. Furthermore, this first encounter highlighted the need to provide spaces for voice where all girls participated. Today, I bring back my memory of the first encounter with participants in this study as a reminder, to keep in the foreground the challenging questions of purpose, benefit and methodology which shaped the ways this study was tailored.

Sites for Voices To Be Heard

The "muddy" question of voice, as Janet Johnson Navarro (1992) wittily reflects in *Will Teachers Say What We Want to Hear: Dilemmas of Teacher Voice (1992)*, is one that deserves close examination. Considering that voice is a representation of an individual's developmental processes and also a manifestation of collective, interactive relationships, the issue of finding spaces for voice became a relevant point for reflection. I believed that in order to gain a rich picture of girls' lives I should offer participants a variety of formats, and places to express themselves, both as individuals and also as a collective, in group settings. In this section I will address the issue of space as a place for voice and elaborate on the strengths and weaknesses offered by each one of the contexts where narratives were elicited.

Interviews

I conducted a first round of interviews to select seven out of the fifteen potential participants who were initially contacted. These interviews provided general background information for selection purposes, and they also served to inform participants about the purposes of this study. All potential participants were interviewed once. Interviews were conducted at the local elementary school that housed the migrant education program, familiar local restaurants in the participants' neighborhoods, including fast food places like

Taco Bell and McDonalds, and local Mexican restaurants. Two girls were interviewed in their respective homes.

After a first round of selection, participants were interviewed a second time. The sites for these interviews varied. Most of them were conducted at restaurants, some were done at the participants' homes, and one interview was done at my apartment. Interviews were semi-structured and open-ended. Most of them were done by the researcher and a few times participants interviewed each other. The format for interviews is included in Appendix A. All second interviews were audiotaped and one was videotaped. Transcripts of interviews were made by a professional typist and the researcher. Table 1 gives an overview of our meeting dates and sites.

Table 1 INTERVIEWS		
DATE	PLACE	INTERVIEWEE
7.12.93	Selina's Home	Selina
7.12.93 7.15.93	Summer Education Program Summer Education Program	Lupita
7.12.93 7.15.93	Summer Education Program Summer Education Program	Magda
7.15.93 8.24.93	Mexican Restaurant Mexican Restaurant	Dominic
8.30.93 4. 3.94	Marisa's Home Mexican Restaurant	Marisa
8.24.93 9. 2.93	Mexican Restaurant Phillips Middle School	Victoria

Table 1 (continued)

11.11.93 6. 14.94	McDonald's Researcher's Home	Alejandra
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Besides serving as instruments for selection purposes, interviews represented a place with particular characteristics, where participants were prompted to construct narratives of experience and narratives of identity in response to my questions. An excerpt from an interview with Lupita illustrates the ways I directed our dialogue towards the construction of narratives of identity connected to school experiences:

Constanza: You know what, last time we talked you mentioned that you wanted to go to a school where there were more Mexican kids. Why is that important to you?

Lupita: It's important to me, because, you know, it helps my self-esteem to go higher, you know, to be proud to be Mexican. 'Cause when I was little, I was, uhm, I went to Florida and I got real dark, like, because a little like African-American. And I didn't like myself the way I looked. And then I wanted myself to be, you know, looking white skinned. And then now, right now, I want myself to look like I did last time.

Constanza: You want to get darker again?

Lupita: Yeah. But the more I get, the more I go in the sun, the more I get freckles. I have to put, you know, suntan lotion or something like that.

Constanza: So you think if you're around people who are darker, you're going to feel better?

Lupita: Yeah, in a way, no, no, it's just that [pause] well, it's hard to explain though.

Constanza: Because you were saying that your self-esteem would be [Pause]

Lupita: Yeah, because, it makes me feel proud because, you know, just looking at them makes me, you know, feel happy that I'm Mexican, and the way they talk and stuff.

[Lupita-Interview-7.15.93]

Given that only the interviewer has the right to define topics and ask questions, narratives elicited through interviews may have different qualities than those elicited in

informal conversation (Cortazzi, 1993). Wolfson (as cited in Cortazzi 1993) argues that narratives elicited through interviews must be read as summaries or answers, as opposed to detailed performances. One could argue, however, that narratives have the qualities of a performance even in the contexts of interviews. Lupita's stories about changing skin color and developing a growing Mexican pride illustrate the ways her narratives were performed in the context of our interviews. However, I considered that the constraints of an interview format could impede the development of voice and I also provided a space for conversation in groups as another site for the construction of narratives of identity and narratives of school experiences in science.

Group Conversations

I organized two conversation groups that met once a week, one on Wednesdays and the other on Fridays. All conversation group meetings were audiotaped. After our fifth meeting, the sessions were videotaped. Transcripts of each conversation session were done by a professional typist and the researcher. Table 2 gives an overview of our meeting dates and sites.

Table 2 CONVERSATION SESSIONS		
CONVERSATION GROUP I		
DATE	PLACE	PARTICIPANTS
9.17.93	Phillips Middle School	Victoria, Marisa, Magda
9.24.93	Phillips Middle School	Victoria, Marisa, Alejandra, Dominic, Magda
10.1.93	Phillips Middle School	Victoria, Marisa, Magda, Alejandra, Lupita, Dominic

Table 2 (continued)

10.8.93	Phillips Middle School	Victoria, Lupita, Magda, Alejandra, Marisa.
10.15.93	Phillips Middle School	Victoria, Alejandra, Lupita, Magda, Marisa.
10.22.93	Phillips Middle School	Victoria, Lupita, Magda, Marisa, Dominic, Alejandra
10.29.93	Science Museum	Victoria, Dominic, Marisa, Magda
11. 5.93	Phillips Middle School	Victoria, Lupita, Alejandra, Marisa, Magda
11.12.93	Phillips Middle School	Victoria, Alejandra, Selina, Marisa, Magda, Lupita, Dominic
11.19.93	Researcher's Home	Marisa, Alejandra, Lupita
12. 3.93	Researcher's Home	Selina, Magda, Dominic
12.10.93	Researcher's Home	Magda, Selina, Marisa, Lupita, Dominic
12.17.93	Researcher's Home	Victoria, Dominic, Lupita, Selina, Magda, Marisa
CONVERSATION GROUP II		
10.13.93	Taco Bell	Lupita, Lisa, Linda, Laura

Table 2 (continued)

10.21.93	Williams Middle School	Lupita, Lisa, Linda, Laura
10.27.93	Science Museum	Lupita, Lisa, Linda, Laura
11. 3.93	Williams Middle School	Lupita, Lisa, Linda, Laura
11.17.93	Researcher's Home	Lupita, Lisa, Linda, Laura

In providing spaces for voice, I had visions of social gatherings, like the ones I knew from my childhood. I also envisioned those sites described by Patricia Hill Collins (1990) in *Black Feminist Thought: Knowledge, Consciousness, and the Politics of Empowerment*, where "women construct independent self-definitions" (p. 95), spaces where we would acknowledge domination, but we would also speak freely. My hope was to create conversation group sessions where we would be able to reveal our "own" selves, our moments of resistance to dominant ideologies as a collectivity, and at the same time allow us to explore our individual differences.

Three considerations were particularly important to me. One was the choice of a site where all participants had access, where they felt welcome and free to speak up. The other concern pertained our interactions in conversation and the establishment of norms that fostered participants' engagement both as speakers and listeners. A third concern was related to the content of our conversation and our agendas. I will briefly address these issues in this section, and further elaborate on some of these points in chapter 4.

Finding a "safe" space for conversations to occur in a public setting did not seem easy. I considered multiple sites for our meetings. With help from the members of my committee, we brainstormed several options: churches, local hospitals, homes, the local

University, local schools, and Community Centers. We considered various factors such as cost, location, and access, and we reflected on the conditions which might enable or inhibit honest and open conversations among participants. For example, we discussed the advantages and disadvantages of holding meetings in a school, as opposed to a place where girls' identities as students become less salient. For some of us, it seemed problematic to raise issues related to school within the boundaries of the same institution.

After our first encounter as a group, I offered a hospital's conference room as an alternative meeting site. The idea generated much talk about girls' experiences with hospital staff, evoking memories of age and ethnic discrimination. One girl mentioned her classmates were not welcome at this hospital for reasons she did not understand. Another girl mentioned her discomfort going into the same hospital store and being followed around as if she was going to steal something. One girl added that she would not accept food at our meetings if they were held at the hospital, for fear of getting a disease.

My images of a safe space included big cozy chairs as opposed to wooden stools, indirect light instead of fluorescent bulbs, a small room that would bring people together and a large table where we would lay out our warm food. I was not thinking of a public school, I had visions of home. Interestingly, we found a friendly place to meet in two school buildings, where administrators, students, and teachers alike gave us tremendous support to hold our meetings. Group I met in Ms. Runner's science classroom, at Phillip's Middle School. Group II met twice at Taco Bell and the following meetings were held at Garfield Middle School, in the teachers' lounge. We stayed within the school buildings for most of our conversations, except for the one time we met at a local science museum.

While searching for a space to meet, I learned that our assumptions about safety, comfort, and freedom to speak differed as much as our backgrounds. I learned, for example, that home was not a universal comforting idea, one on which we could all rely to guarantee a comfort zone to speak openly and safely. Our homes were strikingly different from each other. For some, home was a place where no one would want to be, let alone

have all the other girls come as guests. Home could be a place of conflict and discomfort where the presence of others would disturb out talk. Interestingly, school seemed a more appropriate choice as a meeting site.

Towards the end of our scheduled meetings, we faced the problem of changing our location. This situation arose because some girls expressed interest in continuing our conversations. At the time, winter was beginning and my pregnancy began to interfere with my driving duties. I could no longer offer transportation to and from our meetings, so instead I suggested that we meet at my home. Out of the seven girls in conversation group I, six accepted to continue attending our meetings.

The meetings at my house brought a whole new set of questions and topics for reflection which I will briefly address. The following excerpt from my fieldnotes will give you a sense of the challenging questions that were brought up in this new location:

Coming home created another climate for our conversations. I wonder if my invitation was more likely an imposition to come here and if it was such a good idea. The girls I had met in school settings were quite different at my home. I used to see them jump over a piece of pizza at school, raise their voices and let themselves move freely around the school setting. Now they exhibited polite demeanors, constrained themselves from touching, talking and walking. Actually, they appeared uncomfortable in this setting.

This home was mine, not theirs. Linda put the issues in perspective for me as she caressed my TV set, admired the size of my living room, the sense of privacy and the silence that reigned in my apartment: "I would like to live in a house like this. By myself. With no husbands, children, nothing." [Fieldnotes-11.17.93]

Here I was at my own house, feeling overwhelmed by the influence of my space over our talk. My home brought up the uncomfortable realization that Linda was using my space as a reference point to compare the "haves" and have "nots". Interestingly, I realized how important it was to unveil dimensions of ourselves, such as our class differences, in our conversations. This had not happened in school settings, where our diverse social affiliations were nicely and sometimes conveniently concealed under the table.

In addition to the physical space, the process of having conversations required the establishment of social norms which enhanced everyone's voice. Our talk changed over time, from a very formal gathering with norms reminiscent of school settings into

conversations driven by our relationships, based on a growing sense of trust. During the first two sessions, these norms became explicitly addressed in our talk and we established some understanding about the ways we wanted our conversations to proceed.

One specific purpose of the first two meetings was to learn about each other. On the first session I asked the participants to interview their relatives and write about their family histories. I also structured an activity where we pretended to be an animal. My purpose was to use animal characteristics to describe ourselves. The responses to these activities illustrate the difficulties I faced during the first sessions in trying to create a climate where we were all willing to disclose personal information. Marisa, for example claimed she had been busy because her uncle had died. Magda forgot to write anything and Victoria, the only girl who got the interviews done, did not share it with the group. Our first session was indeed influenced by our teacher/student identities and our knowledge about the ways schools operate. I was the authority figure, the teacher, giving homework and assigning turns to speak. School norms were so strongly embedded in our talk, that Victoria raised her hand everytime she intended to take a turn to speak. I described our conversation in my notes as "pulling teeth," while we played the animal game. During the activity I wondered how much we were learning about each other by imposing a game which did not make much sense.

Dominic's late arrival the following week gave us an opportunity to summarize what we had learned about each other the week before. An excerpt from our second weekly meeting and my reflections illustrates how little we accomplished with this structured activity intended to learn about each other:

Constanza: Tell me a little bit about what we learned about each other last time?
Tell me what we learned about Magda, for instance.

[Silence, giggling].

Constanza: Where did she come from?

Victoria: Mexico

Dominic: Isn't José your brother? That's how I know you. He was in the /?/ exchange program and we went over to pick him. That's how I know you.

(Reflections)

I did most of the talking during this segment. Victoria was remarkably quiet. The conversation seemed dull and superficial. Not much was learned about each other by pretending we were anything else!!!!

[Fieldnotes-9.24.93]

Dominic was prompt in recognizing a personal bond to Magda, rather than showing interest in the analogies we could have drawn from pretending we were animals. In retrospect, I recognize a turning point in our conversations with Dominic and Alejandra's arrival to our group on the second session. Their input helped us break away from rigid teacher/student identities and oriented us to listen to their interests, their concerns, and their humor. An excerpt from our conversations illustrates this point:

Constanza: O.K. Listen to me. I want to make sure that when we meet we all get a chance to talk and to say what we want to say. So one of the things I wanted to ask you is, how do you feel a group should be like in order to feel like you can talk? That you have a voice?

Alejandra: /?/ like me and Dominic [laughter]... You should've seen Dominic when we were at MF after DRN. Remember when we were talking down the hall?

Dominic: You pushed me into a bush. [Laughter]
Because this guy had just shoes and a towel wrapped on his waist and that was all.

Alejandra: And he was walking through the door and [laughter].

[Conversation-9.24.93]

Dominic and Alejandra continued to elaborate their response to my question by giving multiple examples of their desire to speak in any kind of situation. Interestingly, while I tried to make the point that I wanted to hear everyone's voice, Dominic and Alejandra monopolized our talk. Aware of this, I asked Victoria, Marisa and Magda what conditions contributed to make them silent.

Constanza: What situations make you feel like you want to get quiet and not talk?

- Marisa: When people look at you funny. [Laughter].
- Alejandra: You could be a funny looking girl. [Laughter].
- Dominic: Nothing, I'm always loud. Last week I was talking in my sleep.
- Constanza: What about Magda, do you always talk and talk and talk?
- Magda: No.
- /?/: She's shy.
- Constanza: What makes you feel that you can talk.
- Magda: When people are loud?
- Constanza: Really [In disbelief] Really? When people are loud you like talk?
- Dominic: When people are loud me and Margarita just get louder.

[Conversation-9.24.93]

After the first two sessions, I learned that Magda preferred overlapping talk, while Alejandra and Dominic would voice their opinions under any circumstances, except when they had to speak Spanish in front of adults. I also learned that turn taking could lead to withdrawal, rather than enhance the chances for voice. This is what Alejandra and Dominic had to say about assigned turns to speak:

- Constanza: I think that one important condition for conversations to happen is that people listen to each other. And then while one person is talking the other people are listening, so it's kind of a commitment we make, if someone is gonna talk, we're gonna listen to what they have to say because it's important to us. And also, I don't want to make it into a very structured thing like we have to raise our hand before we talk, because that's not a conversation. Or like, I'm gonna go and say, "Magda what do you think about that?" That's not a conversation, like you were pointing out the other day, we were talking and Dominic was saying she doesn't like that style in classrooms because all of the sudden the teacher stops and says, "Dominic, what do you have to say about that?" Well, maybe Dominic doesn't want to talk.
- Alejandra: That puts me to sleep, to be honest, that does.
- Constanza: Right, so we have to find a balance.
- Dominic: That's the point I was making, like if it's a discussion if you have something to say about what they're talking about, then you're gonna say it. Like she has to say well I wait someone is gonna say

well I'll wait to be called cause I have something to say but I want to make sure the teacher knows. You know what I mean?

[Conversation-9.24.93]

During this second session I attempted to gain some insights into the ways our conversations should proceed each week. I also intended to gain a better understanding of the participants' expectations and asked for input in regards to the content of our conversations. As typical in most of our talk, the participants responded to my question in unexpected ways and I followed the lead, allowing some space for them to give their input:

Constanza: So, it's important to keep the conversation going like we're doing here, spontaneously, but it's also important that each one of us thinks who hasn't been able to say what they might be thinking. And they will take time to ask that person, "Would you like to talk? Is there something on your mind?" But avoid both situations where one person is ignored or when a person is put on the spot all the time. And that's something we all have a responsibility to do. So whenever you feel like gees, I can't put a word in here, you must tell us. ...We need to keep an eye on each other to make sure we all get a word in. One thing that I also wanted to ask you is are there any ideas, any topics, you would like to make sure we discuss here, have you given any thought to that?

/?/: Not really

Marisa: Like if somebody doesn't like the way you're doing something. I don't know. [Giggles]

Constanza: Yeah, keep going with that I think that's good.

Marisa: Like the pickles, you brought sweet pickles and we like them dilled.

Alejandra: My mom buys sweet pickles all the time, that drives me crazy.

Constanza: OK, let's talk about menu for next time.

Victoria: Lemons [Uhm mmmmm]

/?/: With salt.

Alejandra: You know, mountain dew or slice tastes good if you dip pickles in that. [Uhm mmmmm]

Magda: [Whispering] Doughnuts.

[Conversation-9.24.93]

This conversation did not lead to the kinds of answers I was looking for in regards to the content of our talk. However, I did follow Marisa's lead, as was typical in every session, because I wanted to honor her input and support her contribution to our talk. The chain of responses about food was suddenly interrupted when Dominic said:

Dominic: I know what we can talk about this week...Like what do you guys like to be called. I know you talked about with them didn't you. What you like to be called and why? Like Mexican, Chicana, Hispanic, Latina. And if you don't really care.

Alejandra: Yeah, that's me.

Marisa: That's me.

/?: I don't care

[Laughter]

Dominc: I like being called Mexican..

Alejandra: I think that's cause I think Hispanic it pertains to everybody, and Mexican gives you a sense of being individual.

Dominic: Uhm-ha. I like Mexican and Chicana.

Alejandra: I like Chicana too. Chicah-nah [Mexican accent]

Dominic: At the fiesta at the a Hispanic Institute, she had a new shirt, you know how they have those shirt that goes with a slash, she had one that said Hispanic and had a circle on it and it says "Soy Chicana." Cause she's really into this kind of thing.

[Conversation-9.24.93]

During the first two weeks some routines were established. For instance, we started our meetings at 3 p.m. with a gathering around food. The menu was varied weekly, but it usually included corn chips, pickles, doughnuts, lemon, salt, and soda pop. During this time our conversation was directed by the participants. Around 3:30 p.m., our conversation shifted in the direction driven by the two high school participants who arrived at this time. Between 3:45 and 4:45 p.m. I introduced questions guided by my dissertation agenda. My intended agenda was loosely sketched for each session and I always listened for opportunities to connect my questions to the participants' topics of conversation.

Around 4:45 p.m. we began wrapping-up time, making announcements for the following week, and cleaning up the room.

The process of having conversations entailed shedding traditional teacher/student identities where the teacher leads the talk and makes decisions about turns to speak and content. From my perspective, it was a process of letting go, and allowing the conversation be whatever it turned out to be. But these developments had their cost. Conversations that grew out of the participants' interests, concerns and questions did not necessarily address the questions that guided this dissertation project. The above excerpts and my reflections from our first meetings give the reader a sense of the ways our conversation norms were established. However, these excerpts do not reveal the dilemmas I faced in regards to the content of our conversations. At times I was impelled towards my agenda at the expense of the participants' voices. This tension between my agenda and their voices was a continuous dilemma which I examine in depth in chapter 4.

Car Talk

Car talk was a space for voice I encountered accidentally. It grew out of the need to provide transportation to some participants. I agreed to drive all participants in Conversation Group II and some of the girls in Conversation Group I, namely Lupita, Alejandra and Magda, on a regular basis. Occasions for car talk provided lengthy conversations, some of them in groups and others one on one. These moments gave me insights into different aspects of the girls' lives. Car talk contributed to give me a different outlook on downtown neighborhoods and a different sense of what counts as relevant as you drive around the city with a group of Mexican teenagers.

In a way, car talk was a space for connections, where we often debriefed our meetings, continued our conversation, and planned our next encounters. It was also a time to share thoughts that had not been expressed in public and establish a closer bond between some of us. The quality of these conversations was intimate and often confidential. Most of

the data drawn from car talk are retrospective, for I protected this space from the intrusive presence of the tape recorder.

Journals

In addition to formal and informal interviews and group conversations, Dominique, Alejandra, Victoria, Lupita, and Linda volunteered to do journal writing. Because writing was perceived as an obstacle for participation in this study, I did not require journals from every participant. Journals became an option for those girls who felt like they wanted to say something in writing about their life in school and at home or experiences in science. Each journal acquired a different character. For Dominique and Alejandra, the journal was a notebook where they intended to put down many interesting thoughts, but unfortunately often claimed to have forgotten to get them on paper. For Victoria the journal turned out to be a place where she transcribed some ideas about science she had previously written for a school presentation and also a place to reflect on the purpose and benefits of our meetings. Linda gave her journal a more consistent character and used it to describe her daily activities and the ways she connected everyday life to science. Lupita used her journal as a place where she would write down issues that appeared interesting to me, given the nature of our conversations and my study.

Responses to journal writing varied in purpose, content, length and consistency. The girls' interest in writing changed overtime and I faced the difficulties of keeping up their motivation to write without turning this into a school chore. But more than a source of data for a study about Chicanas, or a place for girls' voices, journals became guiding sources of topics for discussion in our meetings.

Fieldnotes

Fieldnotes constitute another source of narrative in this study. These include descriptions of different sites where we held our conversation group meetings and interviews. My role as participant in our conversations precluded me from writing fieldnotes during the course of our talk. However, I carried a reflective journal with notes

about topics and reactions to each session. I also generated fieldnotes after interviewing the participants and in the context of schools, where I visited science classrooms. These visits, a total of two per participant, allowed me to gain yet another perspective on students' lives, one that was informed by the tales of experience they narrated in our conversation group.

As a reflective note, I would like to add that fieldnotes were spaces where I tried to make sense of what I heard in our weekly conversations and interviews. My fieldnote writing focused largely on issues that girls had brought up as problematic during our weekly talk. In turn, fieldnotes served the purpose of informing our weekly meetings by providing central topics for elaboration in our conversation group. To the extent that my fieldnotes incorporated participants' issues, they also captured indirectly the intent of their voices.

The issue of space for voice was much more complex than I could ever anticipate. In regards to the location of our meetings, it was evident that space contributed to reveal or conceal dimensions of voice and identity. The relocation of our group, for instance, highlighted some of our differences and revealed dimensions of self which did not manifest themselves overtly in schools. The different formats also helped me raise questions regarding the appropriateness of a particular site as a place to support the process of coming to voice. The selection of an audience for these girls' stories and the ways our conversation was directed towards specific topics and away from personal conflict were all important points for reflection. The issues of site and audience for voice need further exploration and constitute an important line of inquiry for future research.

Writing the Narrative

In many ways, the process of writing this dissertation represents a search to find some order in a seemingly chaotic construction of narratives. What is the best way of giving structure and meaning to these stories? While I attempted to organize this wealth of information, I was conscious of the authority of my voice over the text you are reading and

concerned about issues of authenticity, quality, and the question of criteria to evaluate this narrative.

The work of Connelly and Clandinin (1990) offers an overview of criteria to identify the qualities of writing that render good narratives in educational research. Among others, the authors suggest criteria for the evaluation of narratives that include apparency, verisimilitude, and transferability. They write,

Like other qualitative methods, narrative relies on criteria other than validity, reliability, and generalizability. The language and criteria for narrative inquiry are under development. (p. 7)

Throughout the process of writing this narrative I attended to issues of plausibility, that is, to descriptions that "ring true" and connect participants' experiences to the readers' in ways that "invite" the latter to look and listen to the issues raised from the girls' perspectives.

Voice and Tense

The construction of this narrative raised issues of voice and tense that I had encountered in the literature and that became more apparent when I initiated the process of writing the girls' portraits. How could I freeze time, space, and voice to describe these girls and their experiences? How could I write about people I once knew, and still continue to see without creating an image of rigidity? The following reflections illustrate my dilemmas:

Today it struck me to realize that I am writing as if things haven't changed. It seems like my narratives are ahistorical! I decided to focus on giving them a sense of fluidity. I begin to write: At the time I met Dominique, she wanted to become...

Yvonna Lincoln's (1993) framework for doing research with the silenced suggested a consistent use of past tense, which I followed as guideline. Lincoln observed,

Texts presented in the present tense suggest that the way things were is the way things are, and deny the essential evolution of group, while simultaneously ignoring both the likelihood of change and the possibilities for radical social transformation. (p. 31)

Throughout the process of writing about this study I make a distinction between events as lived and events as told, or what Chatman (1981) calls "storied-time" and "discourse-time" (cited in Connelly and Clandinin, 1990). This is an important distinction

for it attempts to avoid the "illusion of causality," that the events appear to be organized in time in causal or teleological relation to each other.

Issues regarding the representation of voice kept surfacing in my writing as I pulled together information I had collected throughout the course of this study:

The self/other tension emerges again as I go through the data and write assertions. I don't know which voice I am using, theirs or mine? While some of the assertions I am drawing from the data could be best described as commentaries and they simply paraphrase participants' words, others pull ideas from different voices to connect common themes. This is an interesting dynamics, where I use the threads of their voices to construct a more complex tapestry.

[Journal Entry-8.8.95]

Even though my voice carries over the rest, the structure of this narrative is informed by the themes these girls brought into our dialogues, and the silences which compose the final narrative. These girls' voices helped me identify school experiences which influenced their opportunities to learn in school settings. Their voices pointed at issues which I had not considered at the outset in relation to their school experiences, in regards to their perceptions of self and science. In my role of writer I often felt the need to discern between my voice and theirs, to give the reader a more distinctive image of each individual voice. To follow the thread of my voice, I often accompany this writing with an interwoven story where my reflections, dilemmas, concerns and insights are expressed in the use of the pronoun "I".

Narrative Structure

The overarching themes of identities and science served as categories to select and group narratives in transcripts of interviews, conversations, journals, fieldnotes, and reflections. These narratives were re-grouped under common categories like race, ethnicity, gender, academic qualities, age, class, views of schooling, science, and scientists. In addition to notions of identity and science, I read the data for instances of school experiences which described recurrent themes emerging throughout the course of our conversations. These categories included "fighting," "taking tests," "getting grades," "doing and/or learning science."

The themes of identities and science are woven throughout the seven chapters and portraits of participants. But the connections between these themes were not always evident. In fact, these themes seemed to be in permanent tension throughout the enactment of our conversations and the process of analyzing and selecting narratives. Two patterns emerged from the first selection and grouping of narratives. One was the absence of science as an unsolicited topic in our conversation meetings. The second was, the presence of science only in response to my intervention. I used strategies like direct questioning and a routine introduced at the beginning of each session to speak about experiences in science. An apparent tension between narratives of experience in science and other varied topics related to identity issues which came to our conversations unsolicited became a central theme in the process of writing this dissertation. In Chapter 4, I will explore the tensions between identities and science in the enactment of our weekly conversations.

The portraits that are woven throughout this dissertation intend to draw attention to the participants who are central to this study. However, I am aware that by presenting these girls through my eyes, there are many threads that were weeded out or left unwoven. Perhaps the most challenging task I faced in this process of writing the narrative was to draw portraits that do justice to each girl's complex and rich individual qualities. Each description draws from a rich set of data sources, including self-descriptions from interviews, and information I gathered from observations, informal conversations, and, in some cases, journal entries. A few structural patterns run across the portraits. Each participant is located within three contexts: household/family, school, and the place where we met. Throughout the portraits I highlight the themes of identities and science giving more or less salience to each theme according to the ways the girls made them more or less relevant throughout their narratives.

While I intended the portraits to be informative and include relevant data to support my interpretations of participants' narratives, I also wanted to give the reader a sense of the unique qualities of each person. This involved becoming a far more sensitive listener and,

consequently, a sensitive writer. To listen and to write about what girls had to say as well as what they kept to themselves was a particularly daunting challenge. In the next portrait I introduce the reader to Magda, a girl whose enduring silence continuously raised for me questions about my methods and my intention to break her silence. Magda was a recent immigrant who eventually called us to listen carefully, to place ourselves across the U.S. border and visit the world of her childhood memories. Throughout Magda's portrait and a follow up in Chapter 6, I hope the reader will be able to appreciate the challenging task of working with Magda's silence.

MAGDA: PORTRAIT THREE

"Nothin'"

After our first Friday meeting, I drove Magda to her home in downtown Cedarville, a routinary chore that soon became an interesting and unique opportunity to get to know her. Invariably, week after week, given that I do not visit this area of town frequently and most streets are one way, I always followed Magda's directions, who surprisingly, knew her way around the city like the palm of her hand.

Weathered by old age and apparent negligence, her house showed signs of gray paint peeling off its wooden shingles. The fraction number identifying the building indicated that the dwelling had been divided into two different areas. From the outside, it appeared as if Magda's section offered no space to spare. Her front door opened into a devastated empty porch displaying no effort to look appealing. I watched Magda walk across the front yard where a few blades of grass stubbornly peaked over the ground level. A feeling of loneliness and nostalgia invaded me. The empty house showed few signs of life.

Silence is the first quality that comes to mind when I think about Magdalena:
silence in the playground, silence in the classroom, silence during our conversation sessions and interviews:

Constanza: When I write this book, I want to tell people who you are. What do you want me to say about you?

Magdalena: Nothin' [Loud and clear].

Constanza: Nothing? Why?

Magdalena: I don't know.

Constanza: What qualities do you have?

Magdalena: I don't know.

[Magdalena-Interview-7.15.93]

From the very first time I noticed Magdalena at a summer program, I was determined to work with her. I wanted to understand if her silence was a sign of disengagement, resistance, mistrust, or perhaps, a combination of all these. I wondered how Magda could relate to the world in her quiet ways without being stepped over and probably abused. I felt a commitment to work with her in the process of "coming to voice" and challenged myself to break Magdalena's silence.

It was not until my second visit to Ms. Runner's class, when I met with a smaller group of girls, while the boys returned to their classroom, that I became aware of Magda's presence:

I was not surprised, however, to find out that I spoke with greater confidence in the absence of boys. Their presence had carried the burden of justification and in their absence I no longer had to attend to their recurrent question of why they were not included in my study. Now, I could see individual faces. I noticed, in particular, the presence of one smaller girl, seemingly younger than the others, whose faithful look did not abandon me. Her penetrating black eyes, her short and straight black hair surrounding her round face and her quiet demeanor stood out as she sat by her vivacious, boisterous and energetic classmates.

Magdalena nodded her head affirmatively when I asked if she was interested in joining our group. Unlike the other participants, she did not ask any questions, but she took a consent form in Spanish and agreed to take it home to her mother.

[Fieldnotes-7.15.93]

Magdalena was born in Mexico and she was thirteen years old when I met her. At the time, she was beginning eighth grade at Phillip's Middle School.¹ At home, she lived with her brother, who attended Harper Valley High School. Both of her parents came from Mexico looking for jobs and better educational opportunities for their children. Her father, an elementary school teacher, had returned to Mexico City, but Magda often expected news from him and looked forward to his visit the following Christmas.

Magda came to the U.S. four years earlier with an indigenous name that evoked images of a sacred bird native to Mexico. Soon her original name was shortened to become a brief Americanized common nickname which everyone could pronounce easily. I was very curious about Magda's previous life, before she crossed the U.S. border, and attempted to reach out, expecting that her memory of home would elicit a string of tales about her childhood:

Constanza: Do you want to say anything about your hometown. Some people would be very interested in learning about Mexico.

¹ In 1994 Phillips Middle School reported a total population of 1042 students: American Indian 2%, Black 29%, Asian 6%, Hispanic 14%, White 49%; a male/female ratio among Hispanics of 68/83. The percentage of students with satisfactory grades on the MEAP test in 1993-1994 was: math 25.0, and science 41.8. The percentage of students whose financial resources made them eligible for free and reduced lunch was 64.5%.

Magdalena: There is nothin'.

Constanza: Nothing?

Magdalena: No.

Constanza: What was the town like, where you come from?

Magdalena: [Pause] I don't remember [Pause]

Constanza: Small or big, was it a big city?

Magdalena: Yeah. [Pause]

[Magdalena-Interview-7.15.93]

Narrowed down to a series of short answers, I was left longing to hear more about Magda's tales of life in Mexico and wondering why her experiences were reduced to such brief statements. I thought language might be a communication barrier we would overcome if we used our common mother tongue, Spanish. With a sense of relief, both because I feel much more comfortable speaking my mother tongue and because I felt confident that this switch would generate a flow of words contained behind a wall, I said:

Constanza: *Ah pos hablemos español.* /Then let's speak Spanish

Both: [Giggle]

I intended to elicit some narrative that would allow me to introduce to you, the reader of this dissertation, the intriguing person of Magdalena. I asserted:

Constanza: *Y que hablas español muy bien?* /And you speak Spanish very well?

Magdalena: *Aja.* /Uhm-hum

Constanza: *Que viniste aqui porque tus padres querían que tuvieras una buena educación.* /That you came here because your parents wanted you to get a good education.

Magdalena: *Aja.* /Uhm-hum

Constanza: *Que tu madre trabaja.* /That your mother goes to work.

Magdalena: *Aja.* /Uhm-hum.

- Constanza: *Que...que más les puedo decir, que no te gusta mucho el basketball./What else can I tell them, that you do not like basketball that much.*
- Magdalena: *Nooooo.*
- Constanza: *Que te gusta... Bueno te gustan muchas cosas. Te gusta la pizza?/That you like...Well you like many things. Do you like pizza?*
- Magdalena: *Aja./Uhm-hum.*
- Constanza: *Te gusta venir a la escuela?/Do you like to come to school?*
- Magdalena: *Aja./Uhm-hum*
- Constanza: *Por qué?/Why?*
- Magdalena: *Para estudiar./To study.*
- Constanza: *Y por qué crees que es importante estudiar?/And why do you believe it is important to study?*
- Magdalena: *Para que aprendas algo/To learn something.*

[Magdalena-Interview-7.15.93]

Magdalena's short responses in both languages remained a mystery. Most of my questions were followed by long pauses which added great discomfort. This silence felt unfamiliar, almost embarrassing. It reminded me of my feelings of uneasiness in graduate school seminars when the whole audience paused to wait for me to respond or to state a comment in complete sentences. Coming from a large extended family, I was not used to having time to finish my sentences. I wondered if by structuring our conversation in an interview format I was generating similar discomfort in Magdalena, who might prefer a different conversational style. Later in the year, when we spoke about voice in our conversation group, I confirmed my hunch:

- Constanza: What about Magda, do you always talk and talk and talk?
- Magda: No.
- Dominic: She's shy.
- Constanza: What makes you feel that you can talk.
- Magda: When people are loud?

[At this point, several overlapping conversations were emerging between other participants]

Constanza: Really [In disbelief] Really? When people are loud you like talk?

Dominic: When people are loud me and Alejandra just get louder.

Magda: Yeah.

Even though Dominic and Alejandra seemed to relate to the kind of participation in conversation where their voices were raised over those of other participants, Magda's ways of talking in our group were strikingly different. While people talked, as it happened in this conversation, Magda seemed to gain confidence to speak, yet quietly, carrying her comments in the background, seemingly fearful of being noticed. Magda was seldom a lonesome speaker in our conversations and her participation often overlapped with someone else's voice. This overlap in turns at talking seemed to be a condition for her to feel at ease as a conversant.

Car talk was undoubtedly a better way to elicit Magdalena's stories, where she often spoke about home life. After our meetings we often spent a few minutes standing at her front door, a time when Magda did most of the talking. Like the engine in my old car, it seemed as if our conversation needed some warming up and became lively as we drove away from the site of our meetings. Once the school was out of sight, we began to talk about friends and teachers, lunch menus and weekend plans. Standing in front of her rented house, Magda's voice seemed to grow louder, weaving into her stories the presence of a father who lived in Mexico, a privileged brother who had a car, friends, and the liberty to move around town. She also spoke about a working mother who came home exhausted from working at a local flower shop. In her narratives, Magda highlighted economic difficulties and constraints that had a big impact on her ability to build and maintain friendships. Lacking access to a car and a phone line, she was very isolated from social activities. "Borin" was the word she chose to describe her weekends. "I don't do nothin'. We don't go nowhere." Since she moved to the United States, Magdalena lost the support

of her friends and extended family. "If I were in my country," she said, "I would be able to go places, visit friends on Sundays and it would be much better."

A glimpse of what she left behind was captured in a short story that got published in the local newspaper:

My Best Holiday.

My best holiday was Christmas because I went to Mexico City to visit all my cousins and aunts and uncles. It was fun because they haven't seen me since I was three years old. But when I got there I saw two new cousins that were just born. One was five years old and the other one was just a baby. On Christmas I went and got some presents to give them and we went to church to see when Jesus was born and then we had a party. We had food and we looked at pictures all day long. I had fun going to Mexico to visit my aunt and uncle and cousins.

[Cedarville Journal-Undated]

In her stories, Magdalena often brought to life the character of her older brother, José, who occupied a central place in her life. As shown by the way Dominic introduced Magda to other participants in our conversation group, Magda seemed to live under the shade of her brother:

Dominic: This is José's sister [Looking at Alejandra].

In response to this introduction, Magda smiled and looked into her bag for a picture of her brother. She passed it around getting affirmative responses from other girls who claimed to know him. Apparently, José was well known for his independence and outgoing demeanor, which I had witnessed on display at a local shopping mall while I walked with Dominic towards the grocery store.

In spite of a seemingly admiration towards her older brother, Magdalena often made negative remarks about her sibling: "*Psss nada, nunca lo veo, siempre esta en la calle, llega muy noche* / Psss nothing, I never see him, he is always on the street, gets home very late." At home, the presence of her brother marked an inequitable distribution of privileges and duties. Cooking and cleaning, for example, were duties assigned to Magda, while going where one pleased was an exclusive privilege for her brother. Like the Mexican girl

in Lupita's description, Magda lived in a household where she was expected to do all the home chores.

Her language and cooking practices maintained Magda's bonds to her homeland and continued Mexican customs that set her home apart from American traditions:

- Constanza: *Tú te sientes muy mejicana o muy Americana/Do you feel like your traditions, customs, values and beliefs are more like Mexican or American.*
- Magda: *Mejicana*
- Constanza: *Y cual es la diferencia?/What is the difference.*
- Magda: *Como hablo. . .cocino./The way I talk...cook.*
- Constanza: *Tú cocinas y qué haces?/You cook, and what do you make?*
- Magda: *Enchiladas, arroz, tostadas/Enchiladas, rice, tostadas.*
- Constanza: *Y quién más cocina en tu casa?/Who else cooks at your home?*
- Magda: *Mi mamá./My mother.*
- Constanza: *Y tu hermano no?/And your brother?*
- Magda: *Sí sabe pero no quiere. Sí sabe que son las cosas pero no sabe cuál se echa primero./He knows how to cook, but he doesn't want to do it. He knows the ingredients but he doesn't know which one you add first.*
- Constanza: *No quiere aprender./He doesn't want to learn.*

Speaking about education, Magda communicated a recurrent message I heard among other Mexicans regardless of gender, color, class or academic status. She believed that schools were open as one of the opportunities available for Mexicans in the U.S, which offered them the specific advantage of learning English:

- Constanza: *Entonces te pregunto si tú crees que hay oportunidades especiales para la gente que viene de esos sitios, de México./Do you believe there are special opportunities for people who come from México?*
- Magda: *Aja.*
- Constanza: *Como cuál?/Like what?*
- Magda: *Las escuelas./ Schools.*

Constanza: *Y tú crees que esas oportunidades son solo para los Mexicanos?*/And do you believe those opportunities are exclusively for Mexicans?

Magda: *No.*

Constanza: *Qué hay especial para ellos, que sea una oportunidad especial por ser ellos quienes son.*/What is there special for them, a special opportunity for them because of who they are.

Magda: *Enseñarle Inglés.*/Teach them English.

At home, Magda had been taught that learning English was a priority over social life involving other Mexicans or Spanish speaking students. This was one of the reasons Magda used to explain why her mother did not want her to get involved in activities at community centers geared to minority students.

Constanza: *Y tú crees que hay algunas oportunidades que no vas a tener por ser mujer que las tienen los hombres?*/What opportunities are not available to you because you are a woman? A Mexican?

Magda: *Aja.*/Uhm-hum

Constanza: *Como cuál?*/Like which?

Magda: *..Jugar deportes*/ Play sports.

Although the thought of having children of her own did not interest her at the time, Magda's vision of a future career as an elementary school teacher involved small children:

Constanza: *Qué vas a hacer tú cuando seas grande?* What do you want to be in the future?

Magda: *Maestra.* /A teacher.

Constanza: *De pequeños?* /Little ones?

Magda: *Aja.*/Uhm-ha

Constanza: *Y para llegar a hacer maestra tú qué crees que tienes que hacer?*/To become a teacher, what do you think you need to do?

Magda: *Ir al colegio.*/Go to school.

Constanza: *Tienes que ir a college?* Do you need to go to college?

Magda: *Aja.*/Uhm-ha

Magda shared the belief that schooling was a necessary condition to pursue career opportunities. However, her beliefs about the knowledge she needed to become a teacher of younger children were particularly troublesome. As a requirement to become an elementary school teacher, Magda did not include the need to learn science, a subject she often characterized as "borin." As Magda spoke to Marisa in a one-on-one interview about the meaning of science, she claimed the first time she studied this subject was in sixth grade, at the bilingual program:

- Magda: I didn't get science until I was in sixth grade [at the bilingual program]
- Marisa: You still go there? [ref. to bilingual program]
- Magda: No because they say I was too smart. I could go to [the bilingual program], I just need to flunk. They teach more better in there than here...

[Interview-11.5.93]

As Magda recalled her first encounters with science, she remembered experiencing more rewarding learning opportunities at the bilingual program, compared to her present school setting. Membership in this program, according to Magda, required that she "flunk," or not to be "smart." Both descriptors—not being "smart" and "flunking"—raise important issues regarding the underlying assumptions that inform the ways schools structure programs geared for immigrant students who are given identities conducive to failure.

Magda was a border crosser who faced the challenge of assimilation. At the time I met her, Magda was responding to the pressures of cultural and linguistic assimilation, shaping an identity that was forged by her relatively new location. Compared to other girls in our conversation group whose families have been residents in the U.S. for more than one generation, Magda's narratives about the shaping of her ethnic identity offered very unique and interesting insights. It was by listening to Magda that I began to refine my appreciation of Mexican as an identity that is strikingly different for recent immigrants. Clearly, Magda was not one more in the group of Mexicans I met at the summer education

program where she encountered resistance on the part of other Mexicans to become one of them. In this setting she was labeled "mojada," a vivid evidence of the racist forces operating in Magda's new location. Magda was not one more Mexican at Phillips Middle School, where she "hanged out" with recent immigrants from Asia facing the dilemma of living at the borders, of becoming American, learning the dominant language, and at the same time, maintaining an attachment to their homeland.

In this portrait I have revealed the issue of silence as a challenging quality of Magda, a participant who raises for me important methodological issues. As the reader was introduced to Magda, I also highlighted the ways I used various methods to attempt to break Magda's silence. I believe the turning point in this process of breaking Magda's silence happened during a one-on-one interview with Marisa, another member of our conversation group, where both girls talked about the meaning of science in their lives. The thread of science in Magda's life is woven into chapter 6, where I describe other challenging issues faced by this recent immigrant in her attempts to connect life in the U.S. to her experiences in Mexico.

In the following chapter I will focus on yet another methodological challenge. This was the dilemma of introducing science as a thematic pattern in our conversations, at the cost of silencing the participants, or assuming the risk of silencing science to enhance the participants' voices.

Chapter 4

IS THIS SUPPOSED TO BE FOR SCIENCE?

It was our fourth weekly meeting and we were carrying on an agitated conversation about pregnancy, its desirability, or lack of it, and the personal consequences connected to the decision of having children. By the time this meeting took place, I was struggling with a tension between letting conversations flow in the direction the girls were carrying them versus gearing more likely pulling and pushing the conversations towards science. I was pleased with the way this particular conversation was going because everyone there, including Magda, Marisa, Alejandra, Lupita, Victoria and myself, were involved in making contributions to our talk. We all shared our feelings about the number of responsibilities that come along with children and explored the reasons why one might choose not to have kids. But in the midst of this lively discussion Alejandra voiced the following doubt:

Alejandra: Can I ask something? Is this supposed to be for science?

The content and form of this pair of questions laid out roads for inquiry I have not yet exhausted in this text. Both questions raised for me a number of practical and theoretical issues bound together in the enactment of our weekly conversations. Alejandra's request for permission to participate in our conversation: "Can I ask something?" marked the beginning of a series of interactions that led us to expose our own beliefs about the ways we were "supposed to talk for science." In this chapter, I will address Alejandra's questions, "Can I ask something?" and "Is this supposed to be for science?" both as a challenge of our sense of purpose for our talk and as a procedural question referring to the process of having conversations "for" science.

In addressing Alejandra's inquiries it is important to keep sight of several interconnected ways of making sense of her questions. One emphasizes the intentions behind these conversations. The term *supposed* brings to the foreground issues of legitimacy and power: *Whose* agenda were we following in our conversation? Whose voice

was it anyway? Alejandra's comment may be interpreted as a call for authority. If she believed these conversations were supposed to be for science, someone was responsible for guiding them in that direction. How was this responsibility assigned? Who qualified these conversations as being for science, and what were they supposed to look like? Why were we *supposed* to have conversations for science?

With her question "Is this supposed to be for science?," Alejandra also opened a line of inquiry to challenge our notion of the appropriateness of conversational topics. By drawing our attention to the kinds of talk that would qualify as talking for science, she raised for me questions related to the rules governing talk "for" specific content: What qualified as science talk? This issue of topic was particularly interesting, given that we had been addressing pregnancy, a natural phenomenon that has lent itself to the creation of extensive volumes of written scientific discourse about this biological process. However, it was clearly stated by Alejandra that we had engaged in a kind of talk which was not "for" science.

This chapter is structured around a central question brought up by Alejandra, one of the participants in *Conversation Group I*, during our fourth weekly meeting. The dialogue that followed Alejandra's question offered an avenue not only to reveal qualities of our conversation, but highlighted our notions of science as a conversational theme.¹

Throughout the chapter, I unfold multiple meanings of Alejandra's questions. I begin by giving the reader a context to locate Alejandra's question within a series of events during our fourth weekly meeting. This introduction is followed by a microanalysis rooted in the field of conversational analysis which allowed me to establish a connection between the identities of conversational partners and the presence of science in our conversations. This connection led me to reflect upon the strategies I used to introduce science in our

¹ This particular conversation illustrates a point made by Jay Lemke (1990) in *Talking Science*, that talking science requires more than using scientific terms. The science content is defined by a network of relationships among the scientific concepts in a field. In this dissertation, the use of the term theme in the enactment of conversations is consistent with Lemke's notion of "thematic pattern," a network of relationships that describes the science content.

conversation and my role as an accomplice in the establishment of boundaries between conversations "for" science and conversations "for" ourselves. In the last section, *Why is this Supposed to be For Science?*, I engage in a critical reading of the conversational excerpt that became the focus of this analysis and address it from a critical feminist perspective. This latter reading leads me to connect this conversational excerpt to a broader social question and reflect upon the purpose and benefits of having conversation for science: the presence and absence of voice in conversations for science and my participation in delineating the borders of science as separate from our identities.

What is *This* Supposed to Be?

Our conversation sessions were typically scheduled to last from 3-5 p.m. Alejandra's question belonged in a series of interchanges I have categorized as wrap-up time, one of few routines that characterized our weekly meetings. Wrap-up was an event that started with some verbal or non-verbal signal towards 5 o'clock, indicating that our meeting was reaching the end. More than a time to review content, as often is the case after a lesson in schools, I often used wrap-up to prepare for the following meeting, to make announcements, clarify procedural issues or plant a seed to focus the theme of our following meeting. On this occasion wrap-up time began with Victoria's move towards her bag, signaling that she was leaving. This was followed by my invitation to address a question before leaving. I asked if during the coming week we could think about our lives if we had been born boys. This hypothetical situation generated the conversation about pregnancy that triggered Alejandra's question: "Can I ask something?"

What was the referent *this* in Alejandra's inquiry, "Is *this* supposed to be for science?" Was she referring to our wrap-up time, our meeting, our particular conversation about pregnancy, or this whole research study? In the enactment of our conversation, several meanings became apparent. Let us take a closer look at Table 3 showing the excerpt from this conversation, and my reflections which were added during the course of writing this dissertation narrative:

Table 3 Conversation and Reflections		
Participant	Transcript	Reflections
Alejandra:	Can I ask something? Is this supposed to be for science?	I still don't know if Alejandra was calling my authority into question by directing her inquiry to me, or if she was just assuming I had the knowledge to answer her question. The elusiveness of science in our conversations is something I seem to recognize, and communicate in the first part of my utterance. However, the second half communicates doubt and ambiguity, both assertion and interrogation. I do recall my hesitation to qualify <i>this</i> as an encounter <i>for science</i>. I am reminded of my commitment towards participants and their parents who gave consent to participate in a study about science. Marisa implies that this does not seem to be for science. In interviews, Marisa has expressed her lack of interest in science. Given her perception of science as boring and difficult, I read implicit meanings in her statement. One is that she likes it as is, even if it is not for science. Second, that if it were for science it would not be fun. Implicit in her comment is a notion of science that is not fun.
Constanza:	Yaaaah?? [Intonation raises, falls and raises towards the end]	
Alejandra:	Cause I keep forgetting. [Laughs] It's cause I know it and then it seems like, I don't know, it seems like	
Marisa:	It seems like fun but I like it being fun.	

Table 3 (Continued)

Victoria:	You want to know more about science from us, but we want to tell you more because we can sort of talk to you.	Victoria confirms the perception that science is not always part of our talk. Furthermore, she identifies their interests in opposition to mine. Victoria makes the claim that I am interested in science while they want to talk <i>to me</i> , to take our conversations beyond the borderlands of science.
Alejandra:	Yeah, I like telling you more about ..	Alejandra hints at topic as a way of qualifying conversations that are not for science.
Victoria:	I mean, you can't go up to your science teacher and say...well, I [mumbling] son and so on the street and you can't say stuff like that..	Victoria raises an important point about sanctioned discourse in the realm of school science. She brings together the norms of school and science to say that "you" monitor the kind of talk "you" can bring into a conversation with the science teacher. Even though she uses mumbling speech to exemplify the kinds of things she can't say to the science teacher, she hints at experiences on the street, to illustrate the kind of talk she is not permitted to have with the science teacher.
Magda:	Yeah.	Magda is always present at our meetings. However, her involvement is hardly ever noticed on tape, because her utterances are usually short, soft spoken and overlapped.
Constanza:	Okay. That's a good question. Do you think we can get [Pause] why do you think we're going like this and not getting into science?	My response to Alejandra's question confirms once more the perception that conversations for science are different than the ones we are having. Implicit in my question is a search for justification. I believe my response is informed by my belief at the time, that we will get to science topics after we get to know each other better.
Alejandra:	Actually, I like getting to know people better before getting...	Alejandra echoes my rationale and helps me resolve the issue as a procedural matter: first we get to know each other, then we talk about science.

Table 3 (Continued)

Victoria:	Yeah, you're more relaxed and everything.	Does everyone agree that it is better to know each other first? What would happen if we started talking about science and then get to know each other better? Is science unwelcome as a topic of conversation when we are trying to create a comfortable ambiance?
Alejandra:	Cause, I mean, a lot of the things about how you do in science and everything, it depends on how you react to people. [End of Tape]	This sentence leads to a very important issue: the relationship between the personal and science.

[Conversation-10. 8.93]

Unfortunately, the transcript comes to an abrupt ending here just when Alejandra had made an important connection between science and her reactions and perceptions of people. This sudden interruption, marked by the end of the tape, rather than a conversational marker, might seem like a methodological error. However, it is important to note that by the time we began the conversation on pregnancy, we were already getting towards the end of our meeting. Alejandra's last utterance was buried in the commotion of pick-up time, when parents began to drive up their cars to the exit doors by Ms. Runner's science classroom.

Alejandra's question provided some insights into her recognition of a conversational structure in our meetings. In her remark, "Can I ask something?," she acknowledged an awareness of the appropriate choices for involvement in conversation. Alejandra fitted her turn in this conversation by asking permission to formulate a question. She waited for a turn to speak, as she normally had in previous meetings, but this time she prepared us with a short preamble for the contribution she was going to make to our talk. Her request to participate was unusual and I read it as a warning sign and a marker of difference. But I was uncertain about the meaning of her utterance "Can I ask...?" Was she asking if she could take a turn, if she could shift our conversation to a different topic, or was she asking if she could ask a question? The fact that she did not wait for an answer is

evidence that she felt comfortable interjecting, and that her permission was directed towards formulating a question. In this case, she seemed to be saying "Can I ask questions?" This interpretation makes sense in the broader scenario of our first meetings, where I usually assumed the role of inquirer, while the girls responded to my questions. It is important to note then that Alejandra's remark not only interfered with the topical continuity of our conversation, but it also reversed her role and mine. She was directing a question to me, assuming the role of inquirer and at the same time, locating me in the position of respondent, one I seldom had in these first meetings.

From a linguistic perspective our weekly meetings had the discourse pattern of a conversational genre (Hymes 1974 as cited in Gee et al., 1992), with the distinctive characteristic that at least one and not more than one party talked at a time. With some exceptions, we shifted our roles of listener and speaker by taking turns at talk, a basic form of organization for conversation (Sacks, Schegloff, & Jefferson, 1972). However, this rule did not hold true in a consistent way for every single participant. Magda, for example, had a preference to participate in conversations where many people talked simultaneously. When given a turn to speak, she would withdraw from making verbal contributions to our talk if all the other participants were quiet. This personal preference, which she linked to speech patterns she had learned at home, restrained her from making verbal contributions to our talk. However, as shown in her brief utterance in the excerpt above, Magda knew the rules and she was capable of making correct choices to bring herself into our conversation.

From both linguistic and participants' perspectives, there was agreement that we were all engaged in the activity of having conversations. As a conversation, the referent *this* in Alejandra's inquiry can be analyzed to examine the set of rules governing our talk and the ways these rules informed our actions as participants in conversations "for" science.

Is This Supposed...?

Alejandra's questions and her subsequent comments show evidence that her expectation of having an activity for science did not match the ways we enacted our

conversations. Two important themes are implicit in Alejandra's questions. One is the issue of roles participants were expected to play and the ways they were expected to act in the performance of conversations of science. One way of reading Alejandra's questions could be as a check for understanding about the social activity of having conversations for science during our weekly meetings. Another related theme is the understanding of allocation of rights and duties within the activity of conversations for science.

A fundamental premise of conversational analysis informed the ways I read and examined the excerpt following Alejandra's utterance: People share rules to interpret linguistic items and they share knowledge of the world, to which a speaker can appeal (Coulthard, 1977). It is therefore worth examining the conversation that followed Alejandra's inquiry from the perspective of conversational analysis, for this examination sheds some light on the ways we understood the topic of science in conversation and the ways we participated in a conversation for science. These understandings, in turn, informed the ways I made sense of data from interviews, conversations, and observations about girls' participation in school science.

For this analysis, I engaged in a microanalytical exercise to uncover the structure of turn-taking in our conversation. The analytical tools of prosody, cohesion, contextualization clues, and thematic organization (Gee, Michaels, & O'Connor, 1992) support this strategy. I began this analysis with the hunch that turn allocation in our conversation was connected with participants' identities and the social meaning of science. Let us take a second look at the transcript from this conversation. This transcript is marked with conventions that indicate intonation and overlapping utterances.²

Alejandra: Can I ask something? Is this supposed to be for science?

² *Conventions*

- ^^ Intonation change-Tone rise- fall- rise
- // Overlapping talk
- :
-] Prior syllable prolonged
-] Point at which overlapping utterances end
- /?/ Unintelligible utterances or unidentified speaker

(Adapted from Sacks, Schegloff & Jefferson, 1974).

- Constanza: Ye^:::áh? [Intonation raises towards the end]
- Alejandra: Cause I keep forgetting.[Laughs] It's cause I know it and then it seems like, I don't know, it seems // like
- Marisa: ...//It seems like fun but I like it
// being fun]
- Victoria: //You want like] You want to know more about science from us, but we want to tell you more because we can sort of talk to you.
- Alejandra: Yeah, I like telling you more about // (?)
- Victoria: //I mean, you can't go up to your science teacher and say [pause]well, I /?/ on the street and /?/ [laughs] you can't say stuff like that..
- Magda: Yeah.
- Constanza: Okay. That's a good question. Do you think we can get.. why do you think we're going like this and not getting into science//directly.
- Alejandra://Actually, I like] getting to know people better be//fore getting...
- Victoria://Yeah, you're more] relaxed and everything.
- Alejandra: Cause, I mean, a lot of the things about how you do in science and everything, it depends on how you react to people [End of Tape]
- To begin, let us examine the sequence of utterances that opened this section:
- Alejandra: Can I ask something? Is this supposed to be for science? [Looking at Constanza]
- Constanza: Ye^:::áh?

Alejandra's question, "Is this supposed to be for science?" was directed to me.

Both her rising intonation towards the end of the sentence and body language indicated she was assigning the next speaking turn to me. This observation is relevant to this study because it tells us something very important about the ways turns were allocated when the topic in question was science. A pattern began to emerge from this analysis, namely that the presence of science in conversation was connected to my identity. Perhaps because I had set the science agenda from the outset, the introduction of science into our talk appeared to be connected to my presence in the group.

The tone of my response-rise-fall-rise to Alejandra's question could be read both as a declarative utterance and interrogation. In linguistic terms, it was an assertion that involves or entails some query (Halliday 1967, as cited in Coulthard, 1977). The adjacent response "Yea...ah?" reveals that I assumed both the role of responding to a question pertaining the direction of our talk, and also the role of introducing science into our talk. As the science person in our conversation I answered, however hesitantly, to the issue of qualifying these conversations as being for science. I responded affirmatively, for I shared the perception that our conversations were going in directions I could not fit under the rubric "for science." My affirmative response confirmed Alejandra's implicit statement, that these conversations were not for science. Secondly, my affirmation confirmed that there was an underlying agenda which I had explicitly laid out to draw students to this study. I was certain that the participants, parents, school administrators and committee members viewed this as a project about participation in school science. But my response was not a plain affirmation. Rather, it had a "questioning" intonation marked by an elongation of the second half of my response. Before a simple word like "yeah" was fully uttered, I was manifesting doubts that haunted me at the time. How and why was I *supposed* to bring science into our conversation? What were the consequences of bringing science into our conversations? Furthermore, I wondered if we were really supposed to be having conversations for science.

The follow up to my response gave me some insights into the meaning of my utterance from the perspective of the other participants in our conversation. Immediately after my turn at speaking, Alejandra took a turn. Not having access to my thinking, Alejandra seemed to interpret my response as an invitation to say more, rather than a confirmation of her perceptions, or a reassurance that we were supposed to have conversations for science.:

Alejandra: Cause I keep forgetting. [Laughs] It's cause I know it and then it seems like, I don't know, it seems// like

In the next pair of turns we can see how Marisa took a turn at talk by using the strategy of repetition:

Alejandra: Cause I keep forgetting. [Laughs] It's cause I know it and then it seems like, I don't know, it seems// like]

Marisa: //It seems] like fun but I like it//
being fun]

Halliday and Hasan (1976) (as cited in Tannen, 1989) look at repetition as a device to maintain cohesion in dialogue. Marisa's use of "It seems like" appears to be consistent with the purpose of connecting her utterance to Alejandra's. As Tannen points out, however, repetition devices are not merely ways of connecting, but also ways of contributing to the meaning of discourse. Marisa was not only getting a turn at talking, she was also bringing two important ideas to the foreground. One, she was qualifying our encounters: "It seems like fun." Second, she was stating that she liked "it," implying that she did not want "it" to change. Both ideas reinforced my doubts about bringing science into our conversation. Marisa's use of the term "fun" reminded me of a piece of folk knowledge prevalent among some middle school students science is not fun. If our conversations were "for" science, would she come back? Second, Marisa's statement seemed to contribute evidence to the idea that my agenda was not necessarily the same as hers. In her remark there was an implicit recognition of qualities of our conversation she preferred over declaring science our purpose.

Victoria brought the issue of conflicting agendas, namely theirs and mine, to the foreground, by establishing a contrast between my purpose for having conversations for science and their own purposes. A connection between science as conversational topic and the identities of conversational partners became more explicit as Alejandra reinforced the idea that they wanted to talk to me about topics other than science:

Victoria: You want like] You want to know more about science from us, but we want to tell you more because we can sort of talk to you.

Alejandra: Yeah, I like telling you more about// /?/

Victoria continued her train of thought in the next turn where she established the difference between talking to the science teacher and talking to me. The identity of her science teacher, she asserted, precluded her from having conversations about certain kinds of topics. Followed by Magda's confirmation, her assertion pointed at her knowledge of the rules governing talk with specific conversational partners and also suggested that she was aware of rules governing talk mediated by science teachers in the science classroom.

Victoria: I mean, you can't go up to your science teacher and say [pause]well, I [unintelligible] so and so on the street and a [unintelligible] [laughter] you can't say stuff like that..

Magda: Yeah.

Victoria, Alejandra and Magda seemed to agree on the understanding that their relationship with me shaped their talk. Furthermore, both Victoria and Magda seemed to believe that our talk was different from talk that would happen with a science teacher, most likely in a science classroom. This analysis revealed the connection between thematic content and identity, as evidenced in my assumed role of bringing science into this conversation and references to the presence or absence of science in conversations with others. It also rendered some insights into the ways we perceived ourselves as insiders or outsiders to the thematic pattern of science in conversation. Rules like taking turns at talk suggested a connection between science as a thematic pattern in our conversation and hierarchical social structures defined by the social identities of conversational partners. I was the scientist in our group, I also was the person in charge of bringing the group together, and the one who had an intended agenda. These conditions identified me as the authority who would bring the thematic pattern of science into the conversation.

Victoria's observation that conversations with science teachers have distinctive qualities constitutes an interesting topic for future research. I wondered if other girls were aware of discursive practices characteristic of science talk in the classroom. I was also intrigued by the comparison between the qualities of the discourse patterns in our meetings and those characteristic of science classrooms, with science teachers. Just a brief look at the

literature on discursive practices in science classrooms (Lemke, 1990; Rosebery, Warren & Conant, 1992) points at interesting lines of inquiry: How did the use of conversation as a genre in our weekly meetings compare to conversations in science classrooms? Which activities and discursive practices would convert a conversation about pregnancy into "talking science"? How could "talking science" contribute to interpret meaning of narratives about lived experience in science classrooms? This interesting set of questions still remains on the back burner, for I did not explore them fully, but they became important guidelines to inform data analysis and the structuring of this dissertation narrative.

An important pattern emerged after I reviewed the data for evidence of the theme of science in our conversations. One, it became evident that issues related to ethnic, gender, class, and social location in general were separated from issues concerning science. The sequential distribution of questions in my interview protocols illustrates this point. First I grouped questions under the rubric of general background, then I addressed questions related to science and scientists. In conversations, on the other hand, I noticed the introduction of strategies intended to "talk science." For example, I changed the site of one of our meetings and moved it to a local science museum where students engaged in hands-on "science activities." Another strategy was to provide opportunities to set up experiments related to topics currently studied in the science curriculum. For example, following a unit about the central theory in biology, that states that life comes from life, we set up an experiment to test our hypotheses regarding the origin of mold growing on bread. Another strategy was to introduce a routine into our conversation where girls talked about their experiences in science class during the course of a week. Together, these strategies only strengthened the observation that the discursive practices of science that these girls had learned at school were not part of our "ordinary" weekly conversations. Our conversations retained the character of being driven by "their talk," until I intervened to impose the agenda of "talking science." The tension between their talk and talking science became a most interesting dilemma that challenged once more the purposes of this research study.

... for Science?

What was this for? Alejandra's voiced inquiry led me to a question of purpose, one of my primary concerns: Was *this* conversation, this meeting, even this study *supposed* to be for *science*? Alejandra's choice of words, "Is this supposed to be *for science*?" as opposed to "*about science*" expands the idea of what constitutes science to a broad range of possibilities. We could supposedly have conversations that influence the ways students participate and perform in science. For instance, we could talk about conditions that hinder and promote participation in science and support everyone in overcoming obstacles. We could be supposed to focus on improving science grades, an expectation some parents shared. Having conversations for science could mean talk that would motivate students to study science or influence teachers to teach in particular ways. Yet another unexplored possibility was to have conversations that changed science. "For science" could mean having conversations intended to make science better.

At the place and time where we were conducting our meetings we were operating on the basis of two different kinds of narratives that seemed to be in conflict. On the one hand, there were the narratives that informed the intent of the project, namely letters to parents and students, and oral communications; on the other, there were the narratives that we were constructing in conversation, like our narrative about pregnancy. This situation of conflict among narrative expectations created an interesting setting to examine Alejandra's question and our subsequent responses as a way to understand the purpose of having conversations "for" science.

The expectation that our weekly meetings were for science implied that science had been stated as someone's agenda. Alejandra's view was most likely rooted in the way I had presented the purpose of our weekly meetings when she received my invitation to participate. In my letters, I had explicitly spelled out thematic qualities for our Friday meetings (see Appendix B). We were going to have conversations about "experiences in science." Interestingly, the legitimacy of science in our conversation was never questioned

or discussed. No one asked why we were supposed to talk about science, nor did we discuss the need to have conversations as opposed to science lessons, science experiments, science tests, or some other social activity characteristic of school science. The legitimacy of science as a theme for conversations was overwhelmingly accepted by all parties involved: teachers, administrators, parents, students, and myself. The rules for having conversations remained unexamined in our letters of communication, although they did not remain tacit in our first encounters, where we discussed some rules for our kind of talk. To some extent, we relied on everyone's social knowledge of what was expected from a conversational partner engaged in conversations about science.

All these tacit agreements were now challenged in Alejandra's question. Science was the intended purpose, yet it was absent from our conversations. This seemed to be an assumption shared by all participants in our conversation group, myself included. As a point of departure for analysis, this statement had special interest for yet another reason. I wondered why we had the perception of an absence of science, especially in light of other assertions like "science is everywhere," expressed by some participants in subsequent conversations. If participants shared the belief that science was omnipresent, why was it absent from this conversation? Let us take a closer look at this issue.

From the excerpt above, we can infer beliefs about science talk that might account for the perception that science was absent in our weekly conversations. An examination of Victoria's remark about talk in the science classroom revealed that she was aware of norms to engage in such talk. The belief that science talk is about something different than other kinds of talk was expressed in Victoria's assertion: "I mean, you can't go up to your science teacher and say...well, I /?/on *the street* and you can't say stuff like that..." Victoria's remark hinted at topic as one of many qualities of science talk, a belief most likely rooted in her experience at school, where she is most likely learning the sanctioned ways of doing science talk (Lemke, 1990). Her demarcation between talking to the science teacher, as opposed to talking to me pointed at a number of implicit topics she left out when

the conversational partner carried some kind of scientific identity. These tacit issues that are most likely left out of the science classroom, apparently, were making their way into our talk at our weekly meetings. A second belief implicit in Marisa's statement, "I like it being fun," pointed at a dichotomy of having fun, versus not having it. For Marisa, our conversations were distinctively fun, a quality she did not perceive in science talk. A third belief was stated by Alejandra: "Actually, I like getting to know people better before getting..[into science?]." Alejandra expressed a preference towards knowing people before proceeding into something else. I infer from her statement that the way she acted in this conversation was supported by the belief that knowledge about others is different than knowledge about science.

To summarize, the perception that we were not talking "for" science in our weekly conversations seemed to be founded on the feeling of having "fun" expressed by Marisa and the belief that talking science and having fun are different experiences; it was based on the introduction of conversational topics that were outside the boundaries of the science classroom, as expressed by Victoria; and the belief that we need to learn about ourselves before we get to talk about science, as suggested by Alejandra, or that we were learning about each other. These feelings and beliefs explained the perception that science was absent in our conversations.

If our conversations were not for science, then what did we perceive to be the purpose of our conversations? Let us go back to the conversational excerpt and listen carefully to the issue of purpose as an intended quality of our conversation.

Constanza: Okay. That's a good question. Do you think we can get...why do you think we're going like this and not getting into science//directly.

Alejandra: //Actually, I like] getting to know people better be//fore getting...

Victoria://Yeah, you're more] relaxed and everything.

Both Alejandra and Victoria seemed to find a purpose to our talk. Alejandra mentioned one quality of our present conversations, for which she expressed a personal

preference. Our conversations were supposed to help us know each other better. Her commentary implied that we were engaged in talk that allowed us to know people better. A sequential order of thematic patterns was also implicit in her choice: first we talked about people, then we talked about science. Victoria contributed some meaning to Alejandra's assertion by adding that this route of first getting to know people created a more relaxed atmosphere.

So far, our utterances hinted at the assumption that conversations for science and conversations to get to know people had different qualities and different goals. In some ways, we were implying that getting to know who we were was a prerequisite to the thematic pattern of science. But in getting to know people first we participated in reinforcing a dichotomy between identities, notions of self, and science, a separation which is also evident in my interview protocols where I focused on eliciting narratives of identity as a preamble to narratives of experiences in science. This separation between who we are and the objects of study has deep historical roots we can trace back to Galileo. The dichotomy between self and science characterizing the thematic pattern of our conversations informed both the ways we constructed the meaning of science in our talk and the ways we assigned roles in our conversation: I was the science person whose role was to bring in the science, they were people who brought in themselves. Eventually, when my life experiences became part of the conversation, as in our conversation about pregnancy, our official agenda of talking about science seemed to vanish.

The realization that the presence of authority figures such as myself, the researcher, or Victoria's teacher was required for science to become a conversational theme has important implications. As a former teacher who intends to return to the classroom, as a person of minority background trained in biology, and a researcher in science education, I have special interest in exploring the very notion of science we were using to inform the enactment of our conversations and exploring my level of complicity in the construction of a science that has very little to do with the kind of talk where most of these girls

participated. I believe we need to explore the connections between identities and science as it is marked in narratives of school experience. This is the purpose of the chapters that follow. But before we go into this theme, let us briefly examine an issue of purpose that has not yet been addressed: Why was this study supposed to be for science?

The Unquestioned Question: Why Is This Supposed to Be for Science?

Drawing from critical and feminist theories I propose another reading of the discourse event that began with Alejandra's inquiry. As a starting point, I would like to draw attention to the question: *Why science?*--one that is often left unattended in educational discussions about content knowledge. As Walter Secada reminded us at the 1995 Annual Meeting of the American Educational Research Association, researchers concerned with teaching subject matter to diverse learners need to bring this fundamental question of purpose to the foreground: Why is it important to learn this? To whom is it relevant? What is the impact of this knowledge on students' lives?

My intention here is not to make an argument for the presence of science in our curriculum, but to raise the question of "*Why science* " in the context of our conversations. *Why science* is a central question to this study not only because it bears the burden of justification of this research endeavor, but also because it asks for a close analysis of political, conceptual, and ideological positions that frame this research project and its consequences. *Why science* is a question that brings to the foreground issues of power that demand a closer examination of the potential beneficiaries of this research: Who benefitted from having conversations for science? What was so important about science that demanded our attention in our conversation group?

The "*why science* " question was partially addressed in the previous section, through an analysis of conversational structure. A conclusion we could draw from the identification of assigned conversational roles and their corresponding partners' identities is that science was a conversational theme because I was a conversational partner. Simply stated, we were having conversations for science because *I* said so. In the event that I

removed myself from the conversation, as I did on some occasions, science did not appear as a conversational theme. My inclination towards science often rested on the assumption that science is important because it is part of school experiences, it also responded to personal interest, and institutional demands, such as the requirement of completing a dissertation in science education. But I was also inclined to pursue conversations for science because I believed they were good for students who encountered science on a daily basis.

This later assumption was challenged during each one of our weekly meetings. In this informal setting it was problematic to bring science and our lived experiences together, into the same conversational floor. In my role of "pulling and pushing" our conversations towards science I was making a political statement that reasserted my position as researcher often facing conflicting agendas.

The problem of conflicting agendas that place the researcher with all her power and privilege on one end of the balance, and the researched with less power and diverse interests on the other cannot pass by unexamined. This is especially true for a research project which was conceived as a space, not only for Latinas to articulate different views on school science, but also to listen to their voices, to put educators in "touch" with their lives, to learn from them and gain insights into "fundamental questions that shift our discourses from the problem of women in science to the problem of science for women" (Hazelwood, 1993, Dissertation Proposal). Why talk about science when it appeared to silence ourselves?

The contradictions in this study were inherent, for my search for science talk had the potential consequence of silencing those who dared to disagree with a pre-conceived agenda, those who had fun, those who preferred to get to know each other first, those who talked back either in silence or by raising their voices:.

From the standpoint of those who dare, bell hooks (1989) articulates the problem:

When we dare to speak in a liberatory voice, we threaten even those who may initially claim to want our words...Feminist focus on women finding a voice, on

the silence of black women, of women of color has led to increased interest in our words. This is an important historical moment. We are both speaking of our own volition, out of our commitment to justice, to revolutionary struggle to end domination, and simultaneously called to speak, "invited" to share our words. It is important that we speak. What we speak about is more important. It is our responsibility collectively and individually to distinguish between mere speaking that is about self-aggrandizement, exploitation of the exotic "other," and that coming to voice which is a gesture of resistance, an affirmation of struggle. (hooks, 1989, p. 18)

The interesting dilemma of bringing Mexican girls' voices into discourses about science education at the risk of silencing them brought up a problematic issue which required an examination of my intentions: Why did I intend to bring their voices into the field of science education?

A compelling argument to talk science among girls of Mexican origin was the growing demand for literature about the so-called "silenced" in the U.S., paralleled with a growing concern with the problem of participation of women and minorities in science. Discourses in science education called for the need to link multiple social identities and disciplinary issues to enlighten our understanding of participation in science. The need to move beyond mere reporting of quantitative findings and the need to address participation in science in relation to gender, but also to multiple socio-cultural identities, were reasons to engage in talk about science with a group of girls of Mexican origin. However, this justification did not address issues resting at the core of the problem of participation in conversations for science: Would the presence of science silence us? Could we learn to talk science and not silence ourselves? Could we ever talk back (hooks, 1989) and talk science?

I debated over a long period of time whether or not I should direct our talk towards science. In so many ways my work was inspired by the hard and committed efforts of many women inside and outside the field of science who challenge patriarchal discourses and attempt to erode the power of science in women's lives. Following their route, I was inclined to silence science by not talking about it in our conversations. However, the overwhelming presence of science images in communication media, the presence of science in each one of these girls' school experiences, and the fact that we did not question why we

were supposed to have conversations for science are all evidence that science had relevance in these girls' lives.

Looking back, I wish I could reconstruct the conversation that followed Alejandra's inquiry to add this central and most meaningful question to our dialogue: *Why is this supposed to be for science?* Perhaps, by answering this question as a group, we might have proceeded with different intentions and agendas, and gained different insights into the meaning of science in our lives. However, in retrospect, what was left unsaid can also help us read into the social meaning of science in this historical moment. The very fact that we did not formulate the question *why is this supposed to be for science?* had something to say about the ways science could pass as an unquestioned theme to legitimize the purpose of our weekly meetings. Science was unquestionably important.

Science was also a part of everyone's life. There was a paradoxical ubiquitous presence of science in the participants' school experiences, even when the thematic pattern of science was absent in our conversations. The connection between an authority figure and the introduction of the thematic pattern of science in our conversations is one example of the ways our conversation was influenced by the participants' knowledge about science in conversations. Furthermore, everyone in the group had been inscribed by the discourses of school science. I was aware, for example, that Victoria and Selina had been marked in schools, as excellent science students. Victoria aspired to become a scientist and expressed interest in sharing her thoughts about science with other students in this project. By contrast, Magda and Marisa did not get good grades in science, and they did not consider themselves good in this subject, nor interested in it. Whether or not the girls had developed an interest in science, this subject was invariably connected to the process of schooling and it had a place in everyone's life. The overwhelming presence of science in our lives demanded a closer look at the ways the participants were making sense of this subject.

By engaging in conversations "for" science we can explore the ways we have been inscribed by science, we can examine the representations and meaning of science

constructed by a unique group of people, and we can gain insights into the ways we need to make science the ultimate beneficiary of these conversations. It is my hope then, that this dissertation will generate interest in changing the ways science inscribes people, the ways science is represented in schools, and the ways science is practiced at the expense of voice.

As I learned about students' representations of science which came to our conversation unsolicited, I began to refine my hearing, to listen to the ways the participants made sense of science. In the following portrait I introduce Marisa, a girl who told us stories about gaining access to material resources not available to her family. Her narratives are intertwined in Chapter 5, where the participants talk about the trade value of science grades. Marisa's voice is then woven into Chapter 6, where she introduces the notion of science as "everything." Marisa's contrasting stories about remaining marginal, but yet making sense of science in her life reveal the ways she marked her experiences in school in relation to her social location. As you read Marisa's portrait and listen to her narratives in chapter 5, my hope is that you gain an understanding of the ways Marisa's social identities informed the purpose of schooling, the meaning of grades, and the ways she connected to the subject matter of science.

MARISA: PORTRAIT FOUR

"We are always troubled with money"

I first encountered Marisa at her house, a modest wood construction at the corner of a street in a low income, downtown neighborhood. The constant presence of children in the household was evident as Marisa, a medium-sized girl with long black hair and *piel bronceada*/ bronze skin opened the door, letting escape the sounds of her crying sister. I stepped into the house, curious of the staggering activity of the small children who followed us into the dining room. We walked across a living room area furnished with a crib, children's toys, a few chairs, and a large television set. I was invited to sit at the dining room table with a man who introduced himself as Marisa's father. He explained that Marisa's mother was still at work and she could not join us.

Most of our conversation revolved around Marisa's father. I felt uncomfortable because I intended to have an interaction in which Marisa participated actively, not just as an observer. As the conversation developed, it became apparent that Marisa did not want to participate in this project, but that her parents were eager for her to join. Concerned with her hesitant demeanor, I asked her directly if *she* wanted to be a participant in this study. In response, Marisa turned her head towards her father, shrugged her shoulders, and answered uncertainly, "I don't know."

[Fieldnotes-9. 9.94]

Marisa, the oldest daughter in a family of four children, was thirteen years old, beginning seventh grade at Phillips Middle School¹ when we met. Her parents and her three siblings were all born in Cedarville. Her grandparents were originally from Texas and Mexico. Even though Marisa was not certain about the reasons why they came to Cedarville, she agreed they were looking for better jobs. I contacted Marisa to participate in this conversation group in response to the suggestion made by Victoria, one of her friends.

At Marisa's request, I met with one of her parents before she would agree to join our conversation group. As I engaged in an initial conversation with Marisa's father, I searched for common threads that would help me connect to his life. I discovered that we both worked at the state university, where I enjoyed the privilege of having access to a newly renovated office space to which he had coincidentally delivered construction

¹ In 1994 Phillips Middle School reported a total population of 1042 students: American Indian 2%, Black 29%, Asian 6%, Hispanic 14%, White 49%; a male/female ratio among Hispanics of 68/83. The percentage of students with satisfactory scores on the MEAP test in 1993-1994 was: math 25.0, and science 41.8. The percentage of students whose financial resources made them eligible for free and reduced lunch was 64.5%.

materials. I also learned that her mother worked for a linen and sewing company. This realization reminded me of the many worlds I ignore, those upon which I have built my privileges.

Our initial encounter left me with mixed feelings of both excitement and concern as to Marisa's participation. Towards the end of our conversation she muttered a hesitant "okay" to confirm that she was going to join the group. However, Marisa seemed to be deferring to others, in this case her father, the right to decline or accept my invitation to join the project. Her father repeatedly asserted that Marisa should join this group because it would help to improve her science grades, a reason I found troublesome; in addition, he also speculated that this project would keep her busy after school and therefore off the streets.

I left Marisa's house both confused and disturbed by the idea that she was going to join the group under the false assumption that her science grades were going to improve. I was confused because I firmly believed that my verbal and written communications did not even hint that this program intended to help participants get better grades in science. I was disturbed by the mismatch between what I intended to say and the perceptions received. Additionally, I was concerned by what I considered to be a narrow focus on grades rather than the broader concerns I counted as relevant in thinking about girls' participation in science.

My second encounter with Marisa, this time in the company of her mother, shed a different light on the issue of miscommunicating the purpose of my study. When I asked Marisa's parents about their educational backgrounds, Marisa's mom asserted that both she and her husband had gone to high school in Cedarville, where they were born. Then, lowering her voice as if she did not want to reveal a secret, she pointed at her husband and added, "He only made it through tenth grade." This comment contributed an important insight to my understanding of what I had perceived as miscommunication. After I learned that both parents placed a high value on education, that they were highly committed to

Marisa's success in school and one of them lived with the stigma of dropping out of school, I began to view their emphasis on Marisa's grades as their way to monitor and influence her performance at school, rather than just a narrow focus regarding their daughter's connections to science.

These first encounters with Marisa's parents challenged me to question my intentions, my values, and my beliefs about this study, and also my class social location. What did this study have to do with grades, the criterion by which Marisa's participation in science was measured? At the time, I had no answer to this question; in fact, I had not even asked the question, for my intentions went beyond quantified measures of participation to address issues of quality concerning science learning and teaching. Over time, I began to recognize in grades a central theme that deserved examination in order to better understand the relations that girls built with school science, the kinds of connections missing in their experiences with school science, as well as the ways they shape their notions of self.

This issue of grades was raised again, later in the school year, when I asked Marisa to portray herself to the readers of this dissertation:

Constanza: What do you think I should say about you that you really care for?

Marisa: Well, that I used to get bad grades and now I'm doing a lot better. My mom's proud of it.

[Marisa-Interview-4.3.94]

With a sense of pride and a quick smile, Marisa constructed a description of self bound by the institutional demands of schooling and her mother's expectations. This brief portrait had much to say about the ways schooling shaped Marisa's sense of self. But it also disregarded multiple dimensions of her identity which placed her in a broader web of relationships to people who see beyond her life as a student. I asked:

Constanza: Okay. What do you think a friend of yours might say about you? Suzy or Carla.

Marisa: Well, Carla. . .Carla would probably say "easy to talk to" /?/ or if she needs anything, you know, she comes to me. I don't know /?/

[Marisa-Interview-4.3.94]

Compared to the clarity of her own self description as student, Marisa talked about friends' descriptions of her with an air of uncertainty, as if she had run short of words to talk about what they valued in her friendship. Having met one of her friends, a seventh grade classmate, I knew Marisa was also perceived as a bit of a "flirt," someone whose interest in boys drove her away from school matters. "They call me a trick...like I go out with everybody that I see or whatever," she asserted.

In contrast with the other girls in our group, Marisa did not hold strong opinions about labeling her ethnic identity, although she declared a preference towards Mexican as a descriptor for herself. Even though she claimed most people called her Mexican, she also mentioned the use of labels like "beans" to refer to her ethnic background.

Constanza: What names do people use to talk about your background? Like, do they use Mexican, Hispanic?

Marisa: They call me "bean."

Constanza: Why?

Marisa: I don't know...they like to do that.

Constanza: Does that hurt your feelings?

Marisa: No, because I know they're playing a little.

Constanza: Have you been called Hispanic, Chicana?

Marisa: They usually say I'm Mexican.

Constanza: And which name do you prefer?

Marisa: Mexican.

Constanza: Do you know what it means to be a Hispanic or Latina?

Marisa: Not really, my family don't teach me anything...I don't use those words.

[Marisa-Interview-4.3.94]

While Latina, Chicana, and Hispanic were not part of her vocabulary, the derogatory term "bean" had already entered Marisa's notion of self as an ethnic person. Five years ago, I was not aware of the negative impact nicknames like "bean" have on Mexican children. I was then meeting on a regular basis with María Yolanda, a girl of

Mexican descent, who attended a primarily low income, white school. In this setting, I learned children used names of food such as "Mexican burrito" to label and demean her background. This language had spread among children in María Yolanda's school setting without being challenged by any adult. On that occasion, the social studies teacher stepped in and confronted the issue when this language was used in her classroom. Maria Yolanda's response to her teacher's intervention made me aware of the need to question language and confront the use of slur even when it appears to be the norm. This is the main reason why I explored the meaning Marisa made of "bean," my assumption being that she was disturbed by this label:

Constanza: Does that hurt your feelings?

Marisa: No, because I know they're playing around.

Her response was a bit disconcerting, for she seemed to accept the label without questioning its derogatory meaning. Was context a factor that determined the ways she interpreted the use of a term that would otherwise pass as racial slur? In a school where students came from backgrounds as diverse as Laos, Vietnam, Puerto Rico, Colombia, and Mexico, Marisa was not singled out in the same ways as María Yolanda was in her almost exclusively white school. I questioned whether the meaning and strength of the insult might be mitigated when there were more students to share it. I also wondered if "playing a little" to use Marisa's language, meant that the label "bean" was used in humorous situations. Again, perhaps context made a difference and perhaps she had justified a racist practice in the name of "play," as if this would lessen the impact of racial slur.

When Marisa claimed "Mexican" as her ethnic background, she asserted it was stronger than her American heritage because, although she was born in Cedarville, she had a pair of grandparents who were born in Mexico and another set that came from Texas. At home, she said, "We eat tacos, nachos, burritos, tostadas, enchiladas and once in a while we have pizza." While her ties to a Mexican identity connected her to ancestors and home

traditions, such was not the case in the context of school. By contrast, at school she perceived the need to break away from Mexican friends:

- Marisa: Uhm... I don't like people that get in trouble all the time, and then they end up getting me in trouble for something that I didn't do...Lately I've been hanging around a lot of white people. Like Jenny or Kathy and Dora, they're all white.
- Constanza: And you wouldn't do that before?
- Marisa: Not really. I used to hang around with a whole bunch of Mexicans...and blacks.
- Constanza: And what's the difference between.....hanging out with Mexicans and blacks and hanging out with white people?
- Marisa: Well, there's nothing really. I don't know. I don't think anyone is better than anyone else. I just...
- Constanza: Well, maybe I'm not saying that would be better or worse, but just different...
- Marisa: Well, some of the people that I hang around with, that I used to hang around with, they're getting in trouble now, so...
- Constanza: Uh-huh.
- Marisa: I just started hanging around with people that don't get into trouble, and mostly, it's because they're white, you know? I hang around... I think the only Mexican I hang around with is Laura, I don't...

[Marisa-Interview-4.3.94]

The beliefs that Mexican kids get in trouble, that they do poorly in school and do not make "good" company were not new to me. I had also heard Victoria making similar assertions, which indicated she had consciously excluded Mexicans from her group of friends because "they didn't take things seriously." Another Mexican girl attending the same school as Victoria and Marisa had been advised by her mother to stay away from other Mexicans because they would teach her bad habits and delay her progress learning English. Interestingly, these beliefs that fed on stereotypical images and, apparently, on girls' experiences did not preclude them from claiming the label Mexican for themselves. This dilemma of identifying with a group, yet not really qualifying for membership by the standards just described, raised a perplexing issue regarding Mexican identity. Namely,

how can one be a Mexican without being *that* kind of Mexican? It appeared as if Marisa and other girls in this group perceived themselves as "the Other" kind of "Mexican," perhaps even attempting to create an image of a "good" Mexican girl who defeats stereotypical images. In their effort, though, they internalized the belief that in order to succeed in school they needed to break bonds with Mexican friends.

The assumption that Mexican kids are more likely to be involved in situations that break school's disciplinary codes makes me wonder, on the one hand, to what extent this perception corresponded to some factual information about detentions, drop-out rates, and G.P.A.'s or if it was one of those unquestioned "truths" that feeds on itself. If the number of troublemakers was, indeed, characterized by students of Mexican descent, I wondered why their ethnicity was singled out to highlight failure and not success in schools, given that there are Mexican students, like some girls participating in this dissertation group, whose accomplishments in school indicated different levels of success.

Marisa's comparison between her Mexican and white peers may or may not be grounded in personal experience. I took her assertion for a fact and explored her belief that there is a difference in behavior between Mexican students and their white counterparts.

Why did she believe that Mexicans were more likely to get in trouble?

Marisa: I think... now, Mexicans are getting in more trouble than black students, because you know how black students used to always get in trouble, always. Somebody, 'cause I used to hang out with a whole bunch of blacks last year, and they always used to be in trouble, you know, getting to /?/ Mexican people, I have no idea why.

Constanza: Can you give me examples of things that have happened?

Marisa: No. I... last year I used to hang around, like... Lisa and she used to get in trouble by the teachers all the time. And she used to hang around Laura. One of her friends. And then after, now that she's in sixth grade again, she's getting a little bit better, and her friend is getting worse. Her friend used to be really good.

[Marisa-Interview-4.3.94]

Marisa did not explain to me why she believed Mexican kids got in trouble, nor why "they" were increasingly getting in trouble. This appeared to be a common sense

assumption which informed the way she viewed life in school. Neither she nor the other girls who addressed this issue with me would challenge the assumption that one needs to leave Mexican friends in order to succeed in school.

Marisa's friends in school were primarily female, even though she claimed to have a boyfriend and she was known to enjoy socializing with people of the opposite sex. Interestingly, unlike other girls in the group, Marisa's relations with boys were not seen as an interference with academic performance. While she did not single out boys for getting themselves and other people in trouble with school authorities, she did single them out for invading her body. Marisa's quiet voice and calm demeanor did not disclose her ways of being around some boys whose company she avoided:

Constanza: And why don't you hang out with boys at school?

Marisa: Because [Pause]. [Smile].

Constanza: What does that mean?

Marisa: Dooray is an example. Um, he likes to touch my butt. Then I turned around and smack him. I haven't seen him since so he doesn't touch me.

Constanza: What do you do when they mess up with you?

Marisa: I hit them back. [Pause]. If they hit me, you know, I'm going to hit them back. My dad always told me, 'just don't let them hit you. If you don't hit them first, if they hit you first, then hit them back,' whatever.

[Marisa-Interview-4.3.94]

I often thought that Marisa and most of the girls in our conversation group may have constructed stories about physical encounters as a way to engage in conversation and impress other girls in our group. I wondered to what extent their stories were influenced by their audience and to what extent their perceptions were shared by their aggressors. But on my visit to Marisa's science class, I overheard Dooray confirming the image of smacker and hitter portrayed in Marisa's accounts: "You are not going to hit me again next hour," he

said. Marisa looked at him, smiled, and turned her head back to her paper. No apologies or explanations were given.

[Fieldnotes-11.93]

Leaving home and taking care of people were themes that ran across Marisa's views of herself as a woman. At home she fulfilled the role of caregiver for her younger siblings and often baby-sat for other relatives.

Constanza: So when does one become a woman? What makes a person a woman?

Marisa: I don't know. When they're old enough to do things on their own...Some people leave at sixteen, I'm not leaving 'til I'm eighteen...When you're ready to take care of yourself and you even have a family...

For Marisa, the future as a woman held the role of becoming a mother of a girl, described with stereotypical notions of difference, as someone who doesn't "get in trouble as much as the boys":

Constanza: Do you think that you will have special opportunities in the future because of the fact that you're a woman?

Marisa: Maybe...to be able to do stuff nobody does. To take care of a family. I at least want to take care of one kid. I want a baby... girl... Cause a girl I think they're more like, they don't get into trouble as much as the boys do. Boys they're just hard to take care of...

[Marisa-Interview-4.3.94]

Interestingly, Marisa depicted a future life reproducing the same role of caregiver she was already playing in her household. However, when she spoke about her future she also revealed her dreams of earning "good money" in positions like being a manager or lawyer, playing the role of boss outside the household domain:

Constanza: Are you planning to finish school?

Marisa: Yeah...I am planning to be like a lawyer or a manager. I think they're like made it big. They get paid good money... I want to be a boss [emphasized]...They take care of more things, like if a customer has a problem they take care of it.

In regards to the possible obstacles and opportunities she might encounter as a Mexican woman, Marisa did not foresee any particular issues indicating that her race would have either positive or negative impact on her future:

I don't think it depends on race, I think people should do what they want to do and have a chance to do it.

[Marisa-Interview-4.3.94]

Breaking away from the ties of marital status, race, and class to craft a future, Marisa seemed at once visionary and idealistic. One would certainly like to see a young, self-driven woman who can take care of herself regardless of her race, her marital status, or her class. I would like to think that every woman on earth celebrates this ideal and strives to reach it everyday. But I cautioned Marisa and other girls like her, who see the world as it should be while overlooking the constraints imposed on us by virtue of our social identities.

Marisa's narratives about her participation in science are further explored in the next two chapters, where she reveals contrasting stories about remaining marginal, but yet making sense of science in her life. In the chapter that follows I have selected narratives about grades that help us gain a better understanding of the ways Marisa's social identities informed the ways she connected to the subject matter of science through the symbol of grades, and the ways she made sense of the purposes of schooling.

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**SHAPING IDENTITIES IN SCHOOL SCIENCE:
A NARRATIVE STUDY OF GIRLS OF MEXICAN ORIGIN**

By

Constanza Chiappe Hazelwood

Volume II

A DISSERTATION

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Chapter 5

WHAT'S IN A GRADE?

In this chapter I will continue an exploration of the place of science in our conversations by examining the notion of grades, one representation of science that was brought into our conversations by all participants, with relative frequency and, most importantly, unsolicited. I begin by looking at the meaning of grades in conversation and extend this analysis to examine the ways participants' social identities shaped the meaning of a science grade. I selected narratives about grades in conversations that include Selina, a successful student whose grandmother proudly displayed a set of reports, diplomas, and awards on her first interview; Lupita and Magda, two girls whose participation in school was not outstanding; Marisa and Dominic, two girls whose low grades were a concern for parents and teachers alike. By drawing attention to these girls' stories about grades I attempt to highlight the multiplicity of voices represented in our weekly meetings and the impact of our diverse social locations—with their privileges and oppressive forces—on the connections students have built with school science.

My interest in grades as a theme for this dissertation was grounded in a growing awareness of the ways grades shape students' conceptions of collective and self-identities and their perceptions of experiences in school science. In our conversations, grades represented a recurrent and unsolicited point of connection between self, science, and other partners in education; grades were a place of convergence where we could explore the relationships between parents, teachers, counselors, learners, and subject matter. Grades bridged school and home contexts in personal narratives of experience, a connection seldom apparent when we talked about life in school. I began an inquiry into grades realizing that concurrence in the conventional use of letters and numbers as symbols for grades does not imply agreement. Grades were read with diverse assumptions and multiple meanings. My motivation to explore the meaning of grades was partially grounded in the recurrence of this theme, but also in my interest in learning more about the unique relations

that students had built with subject matter of science. What kinds of messages were coded in the letter symbols used in student's academic records?

This Message was Brought to You by The Letters...

"I got a D in biology," Dominic declared in the midst of a conversation about name calling. One after another the other girls joined in with stories about grades. All at once I was faced with a stream of comments that took over the flow of our conversation.

Fortunately, a round of grade narratives simplified life in schools into short, precise, and conventional symbols that took just a couple of minutes. For someone interested in hearing everyone's voice, I should have welcomed the theme of grades in our conversation, as one that had prompted commentary from every single participant. The emerging pattern of participation in our talk about grades, where most girls appeared as well-versed conversants, could have been comforting. But I consciously moved away from this kind of talk for a variety of reasons.

When I was a science teacher, I loathed the end of marking periods with special disgust. Grading students was often a painful process that left a tremendous sense of incompetence, a feeling of inaccuracy and often a number of disappointed faces questioning procedures, outcomes and ways to improve. Given the large number of students I taught, an average of one hundred and eighty every year, the thought of any alternative assessments was, at the time, no more than a dream. My belief that grades were inaccurate representations of students' performance in science was primarily because they did not say much about process in students' encounters with subject matter. Grades were administrative demands which narrowed the scope of students' and parents' attention to subject matter down to focus on end products. I should add that in the school system to which I belonged, grades had a tremendous impact on students' future opportunities, as they defined criteria for dismissal from a prestigious private institution. I came from an institution where "high standards" guided our teaching and learning experiences and I regarded grades as gatekeeping tools which colored the kinds of relationships with science

that my students could build. Just as I had done as a science teacher, in the conversation group I attempted to draw our conversations away from grades, and to lead us into matters that were of more importance to me. I was unwilling to accept that grades were the stuff that mattered to all girls in this conversation group.

From the very first time I contacted potential participants, parents drew my attention toward their concerns about their daughters' performance in school, in particular, their grades. Marisa's father, for instance, had expressed hope for better grades in science as a benefit stemming out of her participation in this research project. Dominic's mother expressed serious preoccupation regarding her daughter's outcomes because her grades did not measure up to her abilities. Most parents and students expressed concern and awareness of school grades and responded to grade messages in varied ways. Interestingly, parents and students did not seem tuned in to school reform efforts in our state, where change in teaching practice was being prompted through standardized testing. Standardized test scores were largely ignored as part of school experiences and their impact was hardly recognized both in conversations and interviews. By contrast, the letters on report cards represented a few points throughout the school year where teachers, parents, students, and counselors alike met to give a look, even if briefly, at students' connections with subject matter.

ABC's in the Culture of Schooling

At the end of October, the girls in both conversation groups experienced two major events. One was Halloween, a holiday that generated expectations among children about the amount of candy they were going to get on their Trick-Or-Treat rounds. The other event was the closure of a marking period, a time that generated much talk about the grades they got on their report cards. On both instances, the girls' talk was lively and interconnected, leaving no doubt about the relevance of these events in their lives.

Constanza: And what did you say about electricity?

Victoria: We were just explaining about what we were doing/

Dominic: She got some bad grades. She got Ds.

Alejandra: I got two Ds.

/?/: Gasps...

Victoria: Girlie?

Alejandra: I wanted to die.

Magda: I got two Ds.

Constanza: Okay, you tell /?/

Dominic: Dang, you guys get all the Es and Ds though.

Alejandra: But I got two Ds and a A and a B. So there.

Magda: I got a A, a B, and then Cs.

/?/: I got a A, two Bs...

Magda: I got A, C C C C C.

/?/: I did B.

Dominic: I hope the camera didn't pick that up. You know.

Marisa: I'm sure it did. [Laughter]

Dominic: Where's this at?

Victoria: I got a B in science.

Constanza: You got a B in science?

/?/: I got an A in science.

Magda: I got a C.

/?/: Did I ask you?

Alejandra: No, but I told you.

Constanza: O.K., Let's talk a little bit more...

[Conversation-10.29.93]

Grades often sneaked in our talk uninvited, drawing everyone into our conversation. The thematic pattern of grades was often continued by most participants, who would contribute to the conversation with comparative statements and justifications,

rather than with in-depth examinations of meaning. Assertions about grades passed by us unchallenged. All girls seemed to make sense of the letters A, B, C, D, E, and F without additional information. Occasionally, a speaker would offer an explanation when the letter symbol seemed unusual, like the letters "I" and "G" in Marisa's and Alejandra's report cards. Marisa, a middle school student, offered an explanation to the letter "I" in her report card as a symbol for an "incomplete," meaning she had not completed the work assigned by her teacher. According to her science teacher, this failure to complete where work was a pattern in Marisa, and a great disappointment. Alejandra, a high school student, interpreted the meaning of "G" as credit for attendance. These explanations were exceptional and only highlighted an apparent common understanding of all the other letter symbols for grades across school settings.

The divide between good and bad grades accompanied by girls' responses like "I wanted to die," supported my perception that grades were a topic girls had mastered. In our conversations, there was an apparent shared understanding that As and Bs were reasons to celebrate, Cs were acceptable, while Ds, Es and Is were viewed as reasons to worry. Girls often shared feelings of guilt, shame and self recrimination at the end of marking periods, after turning in a project, and after getting a graded test back from a teacher suggesting most of them lived by the common expectation of getting "good" grades. However, each person had her own ways of making sense of her individual accomplishments and goals as represented by the letter symbol of a grade. In our group, we had a range of responses to grades—from Lupita and Magda, who showed no evidence of concern, and Dominic who began the school year failing and setting her goals for a B in science, to girls like Victoria, Selina and Alejandra, who aimed at report cards splashed with the letter A.

As a relatively recent immigrant, I still have to translate the meaning of the letter symbols into my familiar grading system based on a numeric scale that ranges from 1-5. Perhaps because of this need to transform information from an unfamiliar grading system into one I mastered as a child, I had a growing disposition to read beyond the gross

division between good and bad grades and elucidate the diverse meanings woven into the reading of a grade. Being aware of my position as recent immigrant, I was often reminded in our conversations of the cultural differences across the participants in our conversation group. I recall a meeting on a freezing cold midwest December afternoon. Selina, Dominic, Magda, Lupita and Marisa sat around my dining room table, a place where some of us had been meeting for three weeks. Water was boiling on the stove and the smells of chocolate and hot apple cider soon invaded the air. The Christmas tree lights bounced off Mexican ornaments throwing a dim glow over our plates. "Cheese for chocolate?" I asked. To my surprise, no one knew what I meant; they had never thrown little pieces of cheese into a hot cup of chocolate and watched them turn into rubbery strands that look like spaghetti. I announced what to expect, and some girls followed my example while others watched with a look of disgust.

- Lupita: This cheese is all rubbery. When I put it in there I thought, I was expecting it to get melted, and it's all chunky.
- Constanza: It's all chunky and chewy?
- Lupita: Yeah.
- Constanza: You want a spoon?
- Lupita: No, that's all right. It's all, it's in my mouth.
- Constanza: So you, did you like your experiment or not so much? [Laughs]
- Lupita: I was expecting it to be all creamy.
- Constanza: All creamy... Not all chunky.

[Conversation-12.10.93]

In a nostalgic voice, I evoked the chunky pieces of cheese in my chocolate cup at grandma's house. On Sundays, my family— including my parents and my sisters, my father's mother, her sister and brother, my cousins, aunts and uncles—sat around the table for "onces," a ritual my children have come to know as a quick and pre-packed "snack." Onces were a time to gather and talk forever, ignoring the mandates of the clock. "Onces" were occasions to learn about each other, when children could hear adults joking around,

arguing about their political differences and defining their alliances. "Onces" were not only rich in conversations, but also abundant in sweets and bakery samples we all contributed to the ritual.

Here I was some thirty years later, continuing the tradition of having onces, feeding our conversations around a hot cup of chocolate. But I did not see in this tradition the threads of a common cultural background pulling the Mexican girls and myself together. At this table my traditions were "ethnic," a term people often use when I bring food to a pot luck gathering. While some girls had heard about melting chocolate paste in boiling water, a cooking tradition one can trace throughout most countries in Latin America, most of them were only familiar with the taste of Hershey's: get your milk, add two spoonfuls of powder, stir, drink and go on with your life.

I soon realized Lupita's chocolate and cheese were not the same as mine, and I marked the distance separating us by calling her disposition to try to melt cheese in a hot cup of chocolate an "experiment," thus implying that experimenting meant to remove her experience from my cherished childhood memories. But however different from my family ritual, our chocolate moment kept its mood of connection to each other and became a place where we positioned ourselves in school life through stories that revealed our diverse modes of relating to the world. At moments like these, an apparent strength of similar cultural backgrounds seemed to give way to our differences. Our conversation around a hot cup of chocolate had been doing just that, pointing at our similarities, while allowing us to probe into our different social positions to see how gender, class, race, ethnicity, age, and generation played out in our stories of experience.

"What's so important about school right now?" I asked. My question was prompted by some conversations with teachers and other adults involved in education from whom I had heard the troublesome message that adolescents were just involved in their social networks and seldom interested in learning subject matter. This piece of "common sense" knowledge became part of my own set of beliefs when I taught biology in middle school

and I often used it to explain students' poor performance or misbehavior in class. An educator later explained to me that hormones account for teenagers' behavior and, consequently middle school is time wasted because students' interests are removed from enriching their academic background and just focused on getting an active sexual life. Likewise, the participants in this dissertation confirmed the belief that their primary interest in school revolved around their social life, rather than understanding subject matter:

Selina: You get to see everybody.

Magda: Yeah.

Selina: That's the main reason I go. To see everybody.

[Conversation-12.10.93]

I was very interested in exploring the participants' social agendas, but I was also particularly curious to learn more about Selina's assertions because she seemed to be communicating a rather different perspective on schooling than the image of excellence revealed in her academic records. I wondered how Selina could combine both agendas of being socially active and academically successful:

Constanza: [You go to school] to see your friends? And... do you think Selina, that interferes with studying? With learning?

Selina: No. I still get good grades.

Constanza: You still get good grades.

Lupita: What'd you get on your report card?

Selina: Five As and a B.

Marisa: That does not even compare.

Constanza: How...how do you manage?

Chorus: Yeah, yeah, how do you manage?

Selina: I don't know.

Dominic: Uh-hum, it's good...[ref. to chunk of cheese in her chocolate cup].

Constanza: But, and you're very active socially, you have a lot of friends?

[Pause]

[Conversation-12.10.93]

Once more, the theme of grades entered our conversation. But this time, I was more aware than ever that my question: "And... do you think Selina, that interferes with studying? With learning?" would have diverse interpretations, most likely as varied as our backgrounds. Selina responded to my question about social life interfering with "studying" and "learning" by connecting it to her notion of good grades. But what did the grades in Selina's report card represent in terms of the ways she related to subject matter? The continuation of this conversation sheds important insights on this question.

Getting the Work Done

Constanza: What do you want to ask her about how she manages?

All talking. [Pause]

Selina: What? Ask me a question.

Magda: I don't know, how you do it? Do you just have easy classes, or you just what...?

Dominic: You just have easy classes or you just what?

Magda: What did you do?

Selina: I do my work, and that's it. I stay at home and I do it, but I still get to go out and all that.

[Laughter]

[Conversation-12.10.93]

By school standards, Selina was a successful student. Regardless of her motivation, she even showed interest in going to school, a quality that stood out as different from the climate lived in Lupita's science class at William's Middle School. Selina's school experiences seemed attractive for their social rewards, rather than academic motivations; but her shallow interest in academic matters did not interfere with her status as honor student. Selina's grades were received by our conversation group with a

combination of admiration and disbelief, to the point that her accomplishments were attributed to having easy courses, rather than personal merit. Selina responded to such comments by summarizing her accomplishments into the simple formula of "doing my work." Interestingly, as illustrated in the excerpt that follows, Marisa, Dominic, and Magda concurred in that doing their work was the way to get good grades.

- Marisa: That's the same thing we're doing.
- Magda: That's the same thing we do, but...
- Dominic: My problem is I always be like, oh, this is easy, I can finish it at home or something,...
- Marisa: Yeah.
- Magda: Me too. I never finish it
- Dominic: And then I always..
- Selina: I don't do that.
- Constanza: Why don't you do that Selina?
- Selina: Cause I want to get it over. I want to get it done and over with. Cause my mom won't let me go anywhere unless I get my work done.

[Conversation-12.10.93]

Our conversation brought to the foreground the idea that getting ones' work done was the standard by which some of these girls were evaluated. I could not help but wonder what Selina would have said if she had been asked how she managed in front of her parents or her teachers. I knew, however, that Selina's "I want to get it done and over with" was more than just a utterance directed towards her inquiring peers, it represented a metaphor for the ways students were evaluated at home and school. I do not intend to assert here that getting the work done was the only existing connection with science that students had constructed at the time; however, in our conversation group and throughout my observations across the Cedarville School District, the notion of "work getting done" emerged as a widespread metaphor representing self/subject matter relations in science classrooms. After I visited Marisa's science class, for example, I learned that she had

consistently failed to complete her work and this was reflected in an "I," standing for work not handed in. [Fieldnotes-11.4.93]. In a different classroom, Victoria's teacher explained criteria for evaluation based upon the completion of a certain amount of work. [Fieldnotes-11.10.93]. In Lupita's classroom her teacher talked about giving students a limited amount of time to get the work done [Fieldnotes-5.5.94].

"Getting the work done" was a criterion used to measure students' participation in science classrooms and it was also an effective metaphor used to enforce household rules related to schooling. If the work was not done, as expressed in Selina's assertion, she would not be allowed to go anywhere. Likewise, if the "work was done," as expressed in the following narrative, Marisa would be rewarded:

Marisa: Because I was supposed to have all my work done, and I had all my work done, but we didn't go to Chicago, I was mad. She told me if I would have done all my work, I could have gone to Chicago with her and my grandma, and my aunts.

[Marisa-Interview-4.13.94]

At the start of this project and throughout the first months of our conversation sessions, Marisa's grades were a cause of concern for her parents and her science teacher. Selina's grades on the other hand, seemed to be quite satisfactory and even a reason for pride. After I learned more about the meaning of grades and the ways this symbol shapes students' connections with subject matter, I am now equally troubled by Selina's good grades as I was about Marisa's low grades. Both girls' connections to subject matter was limited to "getting it over with," and motivated by a desire to move on to another activity. I find it quite troublesome that Selina's pride appeared to be built upon the minimum standard of completing her work, rather than an understanding of subject matter. This kind of connection to subject matter is particularly troublesome in science, a field that emphasizes values like curiosity, openness to new ideas, skepticism, and imagination (AAAS, 1989). A relation to science as work that needs to get done is far from promoting the kinds of dispositions we would like to see in literate citizens who need scientific knowledge to better understand the world around them.

Grades as Predictors of Success

From the conversation above, it appeared as if the message of pride in one's work, which I knew was present in Selina's home, was one which did not emerge in the school settings described by these girls. I was very interested in pursuing this point of rupture between home and school values. I attempted to gain insights into a better understanding of the meaning of grades in home settings by asking girls to talk about parental involvement in response to grades. In particular, I was interested in unraveling implicit messages regarding the meaning of good and bad grades and their consequences. I asked: "Why is it important to do well in school? Does...it make a difference when your mother says something or does something?"

- Dominic: Yeah, because if your parents don't care, then you're not going to care either, right? They're like, oh, you can just /?/ and I've got to do it or else I can't do that. Right?
- Constanza: Why do you think they care?
- Marisa: My parents? Because I, they keep telling me, that, they don't want us kids to be like them, how they were.
- Selina: That's what my mom says.
- Marisa (?): Dropping out.
- Constanza: Dropping out?
- Marisa: They dropped out of school and...then, and they don't have the jobs or something. That's what they always tell me.
- Selina: My mom says that too.
- Constanza: And you believe them?
- ?: Hugh?
- Constanza: Do you believe it?
- Marisa: Well, cause I want to do better than I do, cause, every time Christmas comes, we're always troubled with money. So, and that's, because every day in December, they usually work overtime. So...
- Constanza: So you don't want to have to go through that.
- Selina: Yeah.

- Constanza: And...and how do you see school related to your grades, this month, let's say, to whatever happens on Christmas, in the year 2000 when you have kids, or, or maybe you don't have kids, but, whenever, whatever you're doing, how is that related?
- Lupita: Whatever I'm doing? Well, to do well in life.
- Marisa: Well, I just need to do well because, I don't know, because...I have no idea.
- Constanza: So, how do you think.../?/ your grades will have anything to, how you're going to do in 10 years or more? Why do you, why are you interested in doing well? Is what I'm saying.
- Selina: To pass.
- Lupita: So you can get a good grade, like..
- Selina: To get passed.
- Lupita: Yeah, and, to get like good jobs. Cause then nobody want to uh nobody who like flunked in school a lot in school, like, they don't want nobody that has like a lot of Es. They wanted, cause, when, we might be having all this fun and stuff like that, and you know, some kids you know, just don't want to do their work and stuff, but when they come to where they want, you know, to settle down and get some money and all that stuff, they ain't going to get the kind of job they want, like a business person, or Oldsmobile person, cause they have to get like, cause people be looking in their, your report cards, even from kindergarten to see how you like, your attitude was...your attitude is. And they're like, I don't want to, for them to work for me if they're going to have an attitude in the morning and stuff...
- Constanza: Okay. We'll /?/ what about Selina?
- Selina: What's the question?
- Constanza: The question was, why do you want to do well in school?
- Selina: My mom tells me because she doesn't want me to be like her, cause she had me at a young age, and she couldn't really go to school, so...she just, like, when since I was little, she was telling me like what, asking me what I always wanted to be, and all this, and I still wanted to be the same thing, cause it's like, I was five years old, and so, I guess it just got stuck in my head to do well and do good.

The participants' varied responses to the question "Why is it important to do well in school? Does...it make a difference when your mother says something or does something?" revealed yet another agenda besides the completion of work, which

enlightened my understanding of the meaning of science as a grade. Selina, Marisa, and Lupita responded to my question highlighting different social positions that shaped their belief that doing well in school represented future benefits.

Marisa and Selina justified the need to get good grades based upon the values they learned at home. Selina brought the social dimension of gender into the messages she received from her mother about the importance of schooling: "My mom tells me because she doesn't want me to be like her, cause she had me at a young age, and she couldn't really go to school, so..." At a young age, Selina's mother experienced an early pregnancy that limited her chances of participation in school life. Getting good grades was an important pathway to become someone different than her mother. For Selina being different than her mother meant success in middle school, completing high school and moving towards a career as the dentist she had longed to be since the early age of five. Marisa, on the other hand, expressed a similar message of creating an identity in opposition to her parents': "They don't want us kids to be like them, how they were." However, Marisa's message was framed by the notion of dropout and its economic impact on a family that struggles every year to make it through Christmas: "They dropped out of school and...then, and they don't have the jobs or something. That's what they always tell me... I want to do better than I do, cause, every time Christmas comes, we're always troubled with money. So, and that's, because every day in December, they usually work overtime." In December, when our conversation took place, such messages were not merely a memory, but a vivid experience in Marisa's home life. Not being like her parents meant that she would not become a dropout, a person working overtime during the Christmas season.

Lupita's narrative spoke about doing well in school to "do well in life...and, to get like good jobs." Interestingly, Lupita's understanding of employment policies revolved around the notion of "flunking." She claimed: "they [employers] don't want nobody that has like a lot of Es." Visions of a business person or a worker at one of the largest auto factories in our state, informed the ways she viewed the social ladder and the place of

schooling in her life. Students who did not do their work at school, she claimed, "ain't going to get the kind of job they want, like a business person, or Oldsmobile person." In Lupita's narrative, grades were described as gatekeepers and character judgments which might hinder her chances for future employment: "...'cause people be looking in their, your report cards, even from kindergarten to see how you like, your attitude was...your attitude is."

However diverse, these girls' narratives shared a common message that doing well in school translates into future benefits. The benefits of education were rooted in the unchallenged assumption that schooling had an impact on social mobility. Selina, Marisa, and Lupita emphasized the value of good grades from the standpoint of their respective social locations. Selina brought into our talk the idea that education offered her a way out of gendered constraints. She shared a belief in education as a road towards gender mobility that would grant opportunities like a career outside the household. On the other hand, Marisa and Lupita stressed social class mobility as a motivation to participate in the process of schooling.

Getting good grades and doing well in school were both desirable outcomes in these girls' narratives. I read in Marisa and Selina's narratives the emergence of oppositional identities, not necessarily opposing the dominant culture (Ogbu, 1987) but opposing the gender and class identities of their parents. Based on their parents' frame of reference, these girls viewed in schooling the opportunity to move beyond gender and class constraints that held their parents back. These purposes are at once limiting and visionary. Even if they motivate girls to maintain their school enrollment and continue on to college, they have left a great gap unattended. This is the lack of connection between these girls as knowers, and the subject matter they are learning in school. How can they locate themselves as learners, knowers and constructors of knowledge in their present classrooms when the force that moves them to go to school is hope for potential future rewards?

Grades As Commodities

In the above narratives, Marisa, Selina, and Lupita spoke about the long term benefits of participating in schooling and doing well. What happened when they did not do well in school? Stories about getting bad grades were more common among participants who actually worked towards improving their grades. As I noted earlier, Lupita did not show any concern about doing well in school, while Dominic and Marisa shared with us their struggles to improve their grades in science. As illustrated in the following narrative, grades were a concern in Marisa's household:

Constanza: Oh. And for Marisa...

Marisa: Oh, God.

Constanza: What is it?

Marisa: I...I just got in trouble last week cause of my grades. But my mom, my mom said she's going to let it slip this one and that last one. For my *quinceañera* cause she was supposed to go Tuesday to pay on the /?/, so she let my report card slip, but I still got grounded.

[Marisa-Interview-4.13.94]

Marisa led us beyond the notion of grades as "work done," into the idea that grades were part of a trading system whereby girls deposited funds towards the purchase of future goods. In this case, Marisa's grades represented points towards getting a *quinceañera*, a ritual she and most other girls in the group anticipated anxiously. Like a rite of passage, *quinceañeras* are celebrations in honor of girls who turn fifteen years old. The expectation for most of these girls was that their parents would celebrate the event with a party involving elaborate preparations and major expenses. Knowing this event had great meaning for Marisa, her mother established a trading system of rewards where grades were converted into monetary contributions towards her *quinceañera* party. This exchange system contributed to shape Marisa's interest in subject matter for its trading value, rather than its content, or its impact in the ways Marisa related to the world.

The trading system operated in Marisa's narratives of experiences in school science throughout the year. Towards the end of the school year, for example, Marisa followed the

track of a failing grade in science and claimed that her improvement had been promoted by her mother's rewards:

Constanza: What do you think your science teacher says about you.

Marisa: Um... him, I think he'd say "improving" because his class, I used to be really, really bad, and that's the worst class I had. And I just didn't want to do my work, I just, you know, did whatever I wanted to. You know, he tells me everyday when I turn in my work, he says I'm doing good and keep it up. It's like, "Yap, I know."

Constanza: And did you improve here for the same reasons as the you did before? Because of your mom, basically, or?

Marisa: On that one? Yeah, because we were supposed to go to Chicago, and we didn't go.

Constanza: Because?

Marisa: Because I was supposed to have all my work done, and I had all my work done...She told me if I would have done all my work, I could have gone to Chicago with her and my grandma, and my aunts...

[Marisa-Interview-4.13.94]

Both trips to Chicago and a *quinceañera* party served as immediate rewards that Marisa quickly identified as a motivations to do well in science. On both occasions, it was the figure of her mother who intervened to offer this trade-off and have an impact on Marisa's school performance: "She let my report card slip, but I still got grounded;" "She told me if I would have done all my work, I could have gone to Chicago with her and my grandma, and my aunts..."

Like the system of values based upon the future benefits of education, the system of punishment and rewards established a connection with knowledge for its exchange value, rather than its use for oneself. The commodification of knowledge is problematic because it legitimates and reproduces the ideology of production of knowledge for market consumption, rather than the production of knowledge for social transformation and personal use (Anyon, 1981). Viewed as a grade with an exchange value, science became a commodity in Marisa's, Selina's and Lupita's lives.

To summarize, narratives about grades constructed in our conversation group and interviews suggested that these symbols of success and failure in schools effectively generated responses from parents and students, when the situation called for action. However, grades barely represented the complex issue of participation in school. At best, from these students' perspectives, grades indicated that a student got the work done. Furthermore, our conversations revealed that part of the reason why grades have become effective in generating responses from parents teachers, counselors and students alike, is that they exist within a system of immediate punishments and rewards associated to long term obstacles and opportunities for social mobility.

These narratives about grades raise several problematic issues in regards to students' relations with subject matter. As science teachers and educators endorsing a view of scientific knowledge as socially constructed and a view of learners as constructors of knowledge, we face a current grading system where students relate to knowledge for its future benefit, its trading value, or the satisfaction of work done. While a constructivist approach to knowledge implies a view of students as thinkers with emerging theories about the world (Brooks & Brooks, 1993), a relationship based upon the symbolic system of grades rewards students' passivity, compliance and production of knowledge for consumption, rather than construction. How can these different views of knowledge as construction and knowledge for consumption coexist in the same household, the same classroom, or in the same student? Another girl in our group, Dominic offered a collection of narratives about her experience of improving a grade in science which shed interesting insights on the issue of handling the tension between a position of passivity and compliance in the learning process as opposed to a view of self as an active participant, a knower who can connect to science.

In the following section I will explore the notions of self, knowledge and learner which were revealed throughout a series of Dominic's narratives throughout the school year.

Chronology of "D" and "I"

"I got a D in biology," said Dominic, now a freshman in a local high school. I took great interest in Dominic's stories, among other reasons, because her case appeared to defeat theories of success and failure in school that identify low income, parents' educational background, language proficiency and parental involvement as predictors of success. Dominic came from a middle class background, her parents were both professionals with great investments in education, she had excellent command of the English language, she was an active community member and, appeared to her mother, teacher and to me as smart, confident and assertive. Dominic was not culturally or intellectually deprived. She moved back and forth between American and Mexican cultures with apparent ease, seemingly reassuring the strengths of her Mexican ancestry. She was very knowledgeable about her Aztec ancestors and she admired and respected the people of Mexico, a country where she had family and visited with some regularity. With the profile of a winner, however, Dominic was still failing science.

Dominic's declaration "I got a D in biology" marked the beginning of a short conversation about grades in our group, but most importantly, it did not begin or end here; her utterance had a long story. Her "D" in biology also spoke about a process of reflection and recovery, a search for explanations and justifications. Her "D" in biology was repeatedly mentioned in narratives she constructed in interviews and conversations throughout her first year in high school. I can now read into the declaration, "I got a D in biology" to search for connections between science, self and others. In the simplicity of her statement, the meaning of these connections is elusive; however Dominic asserted with clarity that "I" was connected to "D" and both "D" and "I" were connected to science.

To discern notions of self I rooted the examination of Dominic's narratives on a voice-centered relational practice of research developed by The Project on Women's Psychology and Girl's Development at Harvard University (Rogers, 1993). Annie Rogers (1993) articulates this methodology as a "relational approach to research," which entails

"representing verbatim the voices of girls, and women, including the voice of the researcher." The benefits of this type of approach are numerous. Rogers points out,

The presence of two voices, two perspectives, which may or may not be in harmony or agreement, allows a reader room to agree or disagree with the researcher's interpretations. This voice-centered, relational way of conducting research...is vital to educational research and educational practice because it reveals human differences and limits the power of the researcher's interpretations and generalizations. (p. 267)

After several interviews with Dominic, one-on-one conversations, after my observations in her classroom, and a few tutoring sessions, I began to listen much more carefully to statements like "I got a D in biology." This assertion marked a sharp contrast with Dominic's declaration, at the end of middle school, "I know everything in science." Let's take a closer look at the dialogue we constructed when I interviewed Dominic before she failed science.

"I Didn't get Good Grades because...I Know Everything in Science"

When Dominic talked about her encounters with science in middle school, she evaluated herself as someone who did not do well in science, even though she passed the course with a "C."

Constanza: On a scale of 1-10, how would you rate your participation, interest, ability to do well, and understand science?

Dominic: Five [laughs]

[Dominic-Interview-8.24.93]

Dominic rated her participation in middle school science with a number five, adding a fleeting laugh for additional commentary. This seemingly humorous note only anticipated a set of explanations of the ratings that followed: five for interest in science, ten for ability to understand science, and another ten for ability to do well in science. Interestingly, Dominic perceived herself as someone with the ability to understand and do well in science. However, her low rating for interest in science did not correspond to her perception of self as a capable individual. Dominic spontaneously explained:

Because the class was easy for me. I could easily have just done it but the reason I didn't get good grades is because was because it was so easy and I didn't even

want to bother with it because it was really boring. That's a problem I have too. So it was easy to understand it and it would have been easy for me to get like an A in there with a little bit of effort but I didn't just because I already knew everything. I was concentrating on my other classes that were more challenging and I didn't worry about science. Cause I was like: "Oh I know everything in science." So that's why I didn't participate in it that much except for what I had to do to get you... know without me failing... and my interest was because everything was from the book and he wrote on the board exactly what we were going to do and he never left time for kids to talk about it. You know it was like we were having a conversation and he'd say, "get on it cause we have to do this and this."

[Dominic-Interview- 8.24.93]

For some readers and listeners, Dominic might have portrayed herself in her narrative as a legitimate, typical student with a successful story to tell. School was a place where she was required to "get the work done," and a place where she maintained her grades at a passing level, both goals she met successfully. With skilled mastery, Dominic managed grades like a resourceful administrator on a tight budget. But Dominic's story seemed problematic because it highlighted an interesting mismatch between a high sense of self confidence as a learner, and a low level of participation in science. Her narrative was consistent with research findings indicating that many females who drop out of science do so even though they can do the work. Her narratives were also consistent with the finding that there is a tendency among adolescent girls to find science uninteresting (AAUW, 1992).

Dominic used grades in her narratives to illustrate how a student can successfully pass a course, with a minimum level of engagement, regardless of her self confidence as a learner of science: "It would have been easy for me to get like an A in there with a little bit of effort, but I didn't just because I already knew everything. I was concentrating on my other classes that were more challenging and I didn't worry about science." According to Dominic's narrative, a passing grade in science was enough to fulfill school requirements, even though it did not represent Dominic's perception of self as a knowledgeable and capable person. Her assertions like: "...I knew everything in science," "It was easy to understand it," "I already knew everything," spoke to Dominic's sense of self confidence when assessing her relationship with subject matter. But they also pointed at the

troublesome issue that the perception of knowing science does not mean willingness to participate and it certainly does not translate into performing successfully in the context of schools.

Dominic's "I" in the story about middle school science was a student in control of the game of going to school. This "I" seemed like a confident character who trusted her ability to understand and do well in science, yet measured her involvement and participation cautiously. In spite of a self confidence which might have led one to believe that she excelled in science, Dominic described herself as a compliant student whose teacher's practices undermined her voice and involvement in school science. In her story, Dominic talked about a teacher whose methods and low academic expectations resulted in a boring experience: "...everything was from the book and he wrote on the board exactly what we were going to do and he never left time for kids to talk about it. You know, it was like we were having a conversation and he'd say: 'Get on it cause we have to do this and this.'" Whether or not Dominic's words misrepresent the actual intentions of her teacher or if they coincide with an observer's perceptions, is not the purpose of this analysis. I listened to Dominic's narratives about her experiences in school science to get a better sense of the ways she portrayed herself within her stories and to learn more about the connections she was establishing with the subject matter of science in high school. I did not intend to pursue correspondence with other perceptions of life in school science, but rather, to draw attention to the multiplicity of voices Dominic used when she talked to me about science in school. In the following section I will continue tracking down the "I's," the representations of self in connection to science in Dominic's narratives about her high school experiences.

The Improvement of "D " and the Erosion of "I"

From our conversations about experiences in middle school, I learned that Dominic's stories about success and failure in science were not stories where she described herself as incompetent, nor did she portray science as "too hard." Instead, her narratives about middle school science sent the message that her intellectual abilities were way above

the level of achievement reflected by her grades. Listening to Dominic's words as she spoke about improving her "D" in high school biology, I heard throughout the year a voice of struggle to recover an eroding sense of confidence in herself.

In spite of historical differences and the geographical gap between Dominic and the girls at Emma Willard School, Carol Gilligan's (1989) reflections about the messages she heard in interviews with adolescent girls echoed my thoughts:

I heard evidence suggesting that girls' development in adolescence may hinge on their resisting not the loss of innocence but the loss of knowledge. (p. 5)

Resisting the loss of knowledge seemed to be an appropriate way to frame an analysis of the process of passing science in high school, an experience Dominic recurrently captured in our talk. Dominic seemed to be resisting at once a loss of knowledge and a loss of self confidence which she frequently alluded in her narratives of school experience. I was interested in examining the notion of a "different voice" of relationality and the idea that girls lose their true voices somewhere along their adolescent development. (*ibid.*).¹ I followed Dominic's voices in narratives constructed in the beginning, middle and the end of the school year to listen closely for perceptions of self, others and science in tales about grades. By arranging these narratives in chronological order, I followed the story of Dominic's D, and the connections she made to herself, teachers and other adults involved in helping her with her "problem." The narrative from the end of her middle school year serves as a starting point to begin this story (8.24.93). The second narrative (10. 1.93) comes from a meeting with our whole conversation group when Dominic interjected the topic of grades while we discussed name calling in schools. The third narrative (11. 9.93) was constructed during a one-on-one conversation after a science class which I had observed earlier on the same day. The fourth story captures the end of the school year in an informal conversation with me and Victoria (6.23.94).

¹In light of criticism of Carol Gilligan's work, I looked at these narratives assuming a critical posture towards essentialist notions of womanhood. I do not share the assumption that gender identity overrides girls' experiences. Nor do I ground this work on the idea that women's "different voice" is universal. As these narratives of personal experience tell us, Dominic's depiction of self changed over time, revealing "multiple voices" in her tales.

I began this analysis by tracking the pronoun "I" in Dominic's stories, to pursue the question: "Who is this I whose experience is described in these short narratives of experience?" I then placed close attention to the ways Dominic's "I's" relate to others and the ways she qualified science in her narratives. *Table 4* shows the sequence of narratives which informed my analysis of Dominic's voices throughout the school year.

The firm belief in her ability to do well and understand science, captured in Dominic's statements like "I could easily have just done it ...easy for me to get like an A...I already knew everything," marked a sharp contrast with her statements about the ways she perceived herself in the beginning of her first high school year: "I got a D...I don't do...I don't know...I'm nice, Aren't I? In our conversation on 10.1.93, Dominic connected her notions of self, her teacher, and science in her statements: " I got a D in biology. But it's not because I don't do my work, the teacher just doesn't like me." Her assertion spoke to the meaning of grades as mediators of relationships between her teacher and her self, rather than a reflection of work completed in science. In this narrative, grades transcended the boundaries of school work completed to become qualifiers for Dominic's character. Dominic wrapped up the case of a failing grade in the assertion: "I'm nice," followed by doubt: "aren't I?" which she quickly dismissed with a giggle. As I listened to Dominic's narratives over time, I heard a passive "I" emerging, one who attributed a D in science to a flawed relationship with her teacher. Dominic did not appeal to attributes like being capable, knowing or understanding science to elucidate the meaning of her grade, as she had done in the story she told about middle school. Rather, she recognized an appreciation of herself as a nice person, a quality she sustained for a brief moment and proceeded to frame as a question towards the end of her narrative. Dominic's inner voice that trusted her skillful ways of passing in middle school, was seemingly lost in the first months of high school, when Dominic shared with us that she got a D in biology.

Table 4 Chronology of "D" and "I"			
8.24.93 Interview	10.1.93 Conversation	11.9.93 Conversation	6.23.94 Conversation
Dominic: Because the class was easy for me. I could easily have just done it but the reason I didn't get good grades is because it was so easy and I didn't even want to bother with it because it was really boring. That's a problem I have too. So it was easy to understand it and it would have been easy for me to get like an A in there with a little bit of effort but I didn't just because I already knew everything. I was concentrating on my other classes that were more	Dominic: I got a D in biology/ Victoria: She's got Is [Ref. to Marisa's grades] Dominic: But it's not because I don't do my work, the teacher just doesn't like me. I don't why, I'm nice, aren't I?	Dominic: Today we went to a workshop...and it is goals that you set for yourself. And one of the goals that I had actually written down was to get and A in that class [ref. science] or a B at least... and I know I can do it, but it's just that Ms. Gibson is the kind of person, and not to be mean to her or anything, but it's true and I think that if she really looks at it she'd notice that she really does favor people...Once she	Constanza: How did you end up with ...science? You told me that later the teacher and you got along better and... Dominic: This time I finished up, I think with a C... Constanza: So what happened at the end with your teacher? Cause the last time I saw you, things were not that great.. Dominic: Well, they're okay. I mean, we're on good terms and

Table 4 (continued)

challenging and I didn't worry about science. Cause I was like: "Oh I know everything in science." So that's why I didn't participate in it that much except for what I had to do to get you... know without me failing... and my interest was because everything was from the book and he wrote on the board exactly what we were going to do and he never left time for kids to talk about it. You know it was like we were having a conversation and he'd say, "Get on it cause we have to do this and this."		already has an idea in her head about the kind of person you are and how you are, it's really hard to change her mind about it. And that's why, if she was the kind of teacher who had an open mind, then you know, if she saw that I worked really hard and I got an A on a test, then she would look at that and say, well maybe this person is trying and then she would try to help them. But she doesn't try, she doesn't try to help them.	everything. I don't know. She's difficult. But... Constanza:...she complained about your behavior, I remember, that you were talking too much. Did you stop...what changed? Dominic: She just, her main concern, she said I had to mature. I had a lot of maturing to do. That I had to grow up. So, I don't know, maybe she thought I did. I didn't hear as many comments like that after a while, so...I mean, I just tried to be more mature in her class and not fool around as much. Constanza: Did...did you, I'm trying to understand, what made you change. Was that your own...feeling of...satisfaction or... Dominic: Well, my mom was telling me that she knows I was capa...that she knew I was capable, and that it didn't make any sense for me to be getting like Ds and Es and [?] if I was...you know, if I'm capable, and that she knows that I can make...
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Table 4 (continued)

			Well, I want to be, I want to be in this thing called the...academic decathlon, where you have to go, you go up on stage and present a speech and,...you, it's from all the high schools, and then you can go on, it's like a competition. And Ms. Gibson, who was my teacher, she...she's in charge of that. She's one of the ones in charge of that, and so, my mom said if I wanted to be in that, in order for her to take me seriously, I'd have to start getting better grades in her class. So I [Ms Gibson would say?] well, "Why would I want you to be in this if...in my class you were getting poor grades" and...like that. So, that's...that's part of the reason. And also my mom says there's no reason for me to be getting bad grades in there when I'm...I'm...perfectly capable. And I have all the potential. It just takes my...I just have to do it myself.
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On 11.9.93 Dominic talked to us about her struggle to improve her science grade. At a workshop she had said one of her goals was to get an A in biology: "I had actually written down was to get and A..." Then she continued to reinstate her abilities, going back to a theme she played in her narrative about her participation in middle school science: "... and I know I can do it..." However, this time, Dominic's narrative focused on her teacher's attitudes towards others, rather than Dominic's relation with the subject matter of science: " I think that if she really looks at it she'd notice that she really does favor people.." One more time, Dominic brought up the relationships with her teacher to make sense of her low grades in science.

Later in the year (6.23.94) Dominic talked about her success in bringing her science grade up to a C. When I asked her what had changed, she pointed at character flaws like the need to grow up and becoming more mature, as qualities that her teacher thought she had developed throughout the year: "I had a lot of maturing to do...I had to grow up. So I don't know, maybe she thought I did...I just tried to be more mature in her class and not fool around as much." I asked Dominic about the meaning of the word "maturing" to which she responded: "I don't know, I don't think I changed that much. I was more focused on my work though...so then there's less time that I was talking." As evidenced in Dominic's interpretation of events, the focus on character change left her wondering what had really turned around her biology grade. Maturing, seemed to have been the key to success in school, and from her perspective it seemed to mean that she focused on her work, not "fool around" and doing less talking.

Besides the notion of maturing in Dominic's reflections about her performance in science during her first year in high school, two other themes emerged in her narratives of past experience. One was the trade value of science grades, which in her case bought her a ticket to a prestigious competition in high school, and the other was the notion capability, which re-emerged in the last narrative marking a sharp contrast with previous self-portraits of the nice girl seeking her teacher's approval. In her narratives, grades changed from

representing her teacher's perceptions of character into representation of her ability to do well in science: "I'd have to start getting better grades...I'm...I'm...perfectly capable...I have all the potential...I just have to do it myself."

Dominic's struggle to improve her D in biology was at once a struggle to resist her loss of knowledge of a science she once knew well enough to have access to enriched courses; it was a struggle to resist the erosion of knowledge of herself as a capable person. Throughout her narratives, I heard Dominic's voice of critique and compliance; a voice that talked about dissatisfaction and acceptance; a voice that expressed underestimation of her abilities and self confidence in her intellectual capacities; a voice that spoke to the recognition of a connection between science knowledge and herself, and a disconnection between her knowledge of science and the assessments of competence by which she was evaluated; a voice that grew in our conversations and at once was silenced in the classroom. Listening to these different voices we had much to learn about the contradictory perceptions of self that Dominic was constructing in the context of school science.

In this chapter we have seen how a symbolic system sustained by the institution of schooling can contribute to shape identities that are marginal to science. For all of these girls, grades, a measure of success in schools did not reveal the level of connection they had with subject matter. Yet, grades emerged in conversations with parents, teachers, counselors, administrators and students alike as the common currency used in schools to evaluate students' performance in science and other subjects.

I would like to point out a set of meaningful ideas stemming from the participants' narratives about science grades. All of the girls participating in this dissertation rooted the meaning of science in relation to their schooling experiences. As part of a symbolic system operating in schools, grades shaped the meaning of science by narrowing the broad and complex issue of participation in science to a simple act of "getting the work done." Stories of success in school like Dominic's, raise issues which need further examination. According to all of these girls, the standard of getting the work done was enough to get a

good grade. This low standard contributes to construct "successful" identities that are still marginal to science. Interestingly, while we discussed the topic of grades none of these girls raised the issue that science was "over their heads." Instead, science was portrayed as "boring," or "work to be done," but not a subject that presents interesting challenges. The themes of boredom and unchallenging courses in Dominic's narratives only reinforce the point that passing the course did not imply meaningful connections with the subject matter. For most girls, the goal of passing science was at their reach with minimum requirements like willingness to do the work or, in Dominic's case, talking less in class and reaching the appropriate level of maturity.

Dominic's narratives about grades revealed yet another way of making sense of her participation in science. The issues she raised concerning the meaning of a failing grade connected science to her views of self-identity. Her narratives talked about grades as representations of personal qualities, relationships with teachers and measures of students' capabilities and potential. Dominic's science grades sent messages about her sense of self, rather than her knowledge of subject matter. Dominic revealed another agenda she pursued throughout the school year, to resist the erosion of self as a competent, capable student who "just can do it myself." Dominic's voices across the school year brought to the foreground the important realization that students bring to the science classroom a wide range of understandings about the meaning of science in their lives.

Dominic's responses to schooling were also influenced by a position of resistance to dominant discourses about her ethnic identity. Dominic's voice was often an eloquent call for the transformation of negative images of Mexicans. The words and portrait that follow will give the reader a sense of the ways Dominic embraced the promises of education and took it upon herself to become part of the transformation of being Mexican in U.S. society.

You know, like if people look down on... Mexicans or the Hispanic, then ...you could either prove them right or prove them wrong. And if you act ignorant and you don't know how to present yourself, then you're just proving them right. But, you know, if you prove it yourself and, in a respectable manner, you know, you're

mature and you're not ignorant, and you know how to present yourself, then they'll say, well, you know, maybe I was wrong. Maybe not all Mexicans are like that, or, you know, maybe I should reconsider what I said. And...like, to me, it was always really confusing when I was little, because, I...one other thing I was going to say was my parents always say, you know, you could say Viva La Raza and say, soy Chicana or whatever, but... if you choose to say that, and if you choose to be proud and everything, then you have to present yourself that way.

[Conversation-6.23.94]

DOMINIC: PORTRAIT FIVE

"I am proud...proud of what I am"

A small shopping mall towards the edge of the city of Cedarville housed Dominic's favorite Mexican restaurant, one of the best in town. This was the place where we agreed to meet for the first time. I knew Dominic's mother, a dynamic member of a Chicano local organization and an active participant in school activities concerning minority students. She had helped me contact her fourteen-year-old daughter and some of her friends. While I waited for Dominic my expectations regarding our first encounter were building up and I got caught daydreaming about the outcomes of this project. The aroma of fresh tortillas invaded the air when a young looking, fair skinned girl entered the restaurant sweeping a bundle of long black wavy hair. She led the way with a fast pace and turned her head quickly, scanning the restaurant as if she was looking for someone. I soon realized this was Dominic, followed by her mother, who stepped in quickly, trying to catch up with Dominic's fast steps. I raised my arm to catch their attention. They made eye contact with me and walked promptly towards my table. My friend introduced her daughter, Dominic, who addressed me with an affectionate hug and a formal, "Hello, Mrs. Hazelwood." Even though I had never met her, I sensed right away Dominic would become an important contributor to our conversations.

[Fieldnotes-7.15.93]

Dominic's endless bundle of energy cannot be captured in these pages. In her emphatic words, "I am involved," one may get a glimpse of her disposition to engage actively in different kinds of programs, especially those related to cultural issues:

I am proud, proud of what I am. Proud of my culture and my race... I like to participate in things, especially things that have to do with my culture. So I am involved. I think I also have a pretty good sense of humor, I get that from my dad. I am easy to talk to. Everybody tells me I am really outgoing. It's hard for me to stay focused and concentrate unless it's something I am really interested in. And so if something is not interesting to me my mind, it tends to wonder [laughs]. I am caring, I care a lot about people and I care about everybody. I worry about how people feel if their feelings are hurt...but I also have a bad temper, I think.

[Dominic-Interview-8.24.93]

I gained an understanding of Dominic's idea of involvement when I tried to set up a time to meet with her. Finding a slot for me was a lengthy process that entailed juggling numerous activities in her busy schedule. Trips around the country, baby-sitting jobs, volunteering at a local hospital, and participating in several programs were only a few of

many commitments she had undertaken this summer. Finally, she booked me for an interview between jobs.

Throughout our interviews, our one-on-one and group conversations, Dominic drew me towards her world, her values, and her beliefs with a remarkable awareness of her cultural roots and a disposition to highlight her cultural identity. She was the daughter of two professionals, originally from Mexico, who were actively involved in schools. Dominic's pride in her Mexican culture and race were accompanied by an understanding of her ancestors' history, one I found outstanding as I compared her to the other dissertation participants.

Dominic's interest in her Mexican heritage was voiced consistently on interviews, conversations and journal writing. On repeated opportunities, our group engaged in conversations about cultural identity guided by Dominic's initiative:

Dominic: I know what we can talk about this week.

Constanza: Okay.

Dominic: Okay. What do you guys like to be called? I know you talked about that with them too, didn't you? What you like to be called and why? Like Mexican, Chicana, Hispanic, Latina, or do you don't really care?

[Dominic-Conversation Group-9.24.93]

Dominic's cultural background was also a decisive quality influencing her choice to participate in numerous after school activities and enrichment programs, including this dissertation study:

I think, you know, it's important to support programs like this [dissertation study] that deal with Hispanic kids and, you know, the Hispanic community because that way people can learn more about Hispanic people, you know?

[Dominic-Interview-8.24.93]

Towards the end of the school year she wrote in her journal:

I enjoyed it [this group] because I like to get involved with my own race and things that benefit us as a group.

[Dominic-Journal-6.16.94]

Throughout the year, Dominic attended a Hispanic Institute and participated in cultural events involving Chicanos in our community. During the previous summer she attended a meeting of the National Council of La Raza and participated in academic programs geared to minority students.

But Dominic's self pride and interest in her culture did not protect her from the structural and ideological constraints of racism. For example, when she talked about the ways people use the term Mexican to refer to her background, she hinted at her reactions to potential negative connotations of the term:

Some things that people can say that make me mad. Like if someone says that I am Mexican I'll just let it pass, but if someone says something like you know against to offend my culture and like my race or to offend someone that may be like if I heard someone talk about someone who was blind that would bother me because I know that that person can't help that.

[Dominic-Interview-7.15.93]

Interestingly, in her illustration of "things that people can say that make me mad," Dominic used the notions of race and culture both as markers of difference that sometimes she "lets pass," but also as borders that cannot be crossed. By comparing her condition to a blind person, it appeared that Dominic was bothered by the references to race and culture which alluded to conditions that people "can't help." This other way of looking at race and ethnicity, aside from the pride described in the opening pages of this portrait, pointed to the struggles entailed in shaping identities that go against the grain of oppressive forces of racism. A poignant story from one of our conversation group sessions described this struggle:

Dominic: Oh, I was so mad in this class I had to take in high school and this boy Carlos was in there and, our gym teacher we were doing the swimming in the pool and Carlos was like "I don't want to swim." He said, "I don't know how." He was just playing around, you know and our coach said, he said "you should be a expert at that,

right? Didn't your family swim across the river?" He didn't even said nothing, he just left.

Alejandra: I would have got so mad, I would have /?/ I don't know why you didn't because if I had been there I know I would have.

Constanza: What would you do?

Alejandra: I would have told him you would be mad if I called you you know, a white boy if I would have made some joke that "You white people can't jump."

[Laughter]

Dominic: But you know, some people, what really makes me mad is sometimes I don't really care if someone make jokes about my culture because I think if there is a reasonable understanding between two people, that it's okay, but if somebody doesn't know you well enough and doesn't respect you enough and then start calling you names, or saying things, I think that's wrong.

Alejandra: Personally I don't care how much I know someone I wouldn't let them call me a "spic" or a wet back, or any other racial name. And I think it's degrading that people call themselves that. And I don't understand it.

Dominic: That's like saying that I'm less of a person, or I'm lesser than you cause [giggling]

Constanza: Has anybody here been called wetback or...

Victoria: I have.

Magda: I have.

Dominic: I've been called "spic".

[Conversation Group-9.24.93]

Dominic spoke as an experienced member of an ethnic group that was identified by derogatory terms. It struck me as interesting to hear Dominic's distinction between her reactions to those people who "joke" about her culture, and those who do not "know you well enough" or do not "respect you enough." Unlike Dominic, Alejandra expressed her disapproval of such distinction, "Personally I don't care how much I know someone I wouldn't let them call me a "spic" or a wetback, or any other racial name." She added, "And I think it's degrading that people call themselves that." Derogatory terms were used among students of Mexican origin, even when the terms were degrading to their own

group. As our conversation drew in more participants we found out, for example, that Magda had been called "*mojada*"/wetback by other students of Mexican origin. I was struck at the time by Magda's passive response to name calling, and wondered why the participants in this dissertation showed such wide range of responses to derogatory terms. These varied responses to racial terms, hinted at different dimensions of ethnic identity related to tenure in the U.S.¹ Magda, a first generation immigrant to the U.S. who had little contact with people from the mainstream, did not manifest a strong emotional reaction to racial terms; Alejandra, a long-term resident born to former migrant parents, showed sophisticated levels of awareness and strong emotional responses to the use of racial slur. Dominic's responses to derogatory terms appeared somewhere in between, growing towards Alejandra's views, but still driven by her understanding of personal intent rather than her loyalties to a social group. I wondered how Dominic's family's short tenure in this country shaped her ethnic identity in ways that set her apart from other participants in our conversation group. I explored the ways Dominic balanced the Mexican and American sides of her ethnic background on an interview by asking: "Do you ever call yourself Mexican-American?"

Dominic: No, I don't really say that. When people ask me what I am, I usually say I am Mexican. To me I am Mexican-American but, you know.

Constanza: Do you feel like you are more American than Mexican or the other way around or you don't think about that at all?

Dominic: I didn't but then when I went to *México* I was seeing another person that's in the Guadalajara exchange program. I won't mention his name because I don't want to misquote him or whatever but he said he didn't realize how Americanized he was until he went to Mexico. That was the same thing for me. When I went to Cancun it was like a big tourist attraction. But when I went to Mexico City to stay with relatives it was different and I realized I really was Americanized.

¹ Studies on immigrants directed my attention towards differences in responses to racial slur. In *Social Identities—A Framework for Studying the Adaptations of Immigrants and Ethnics: The Adaptations of Mexicans in the United States*, Hurtado et al. (1994) assert that first and later generation of Mexican descendants live in different historical and ecological social contexts. Therefore, the unique identity patterns expressed in Dominic's emotional responses might be explained as a consequence of the proximity to Mexico which allowed her to visit frequently, and the collective history of U.S. citizens of Mexican descent.

Constanza: Like what did you notice?

Dominic: Just everything like everything...things just operated different, I don't know, it's hard to explain... I didn't really think I was.
[Laughs].

[Dominic-Interview 8.24.93]

As a border crosser, Dominic maintained bonds with *México* through regular visits to this country. Interestingly, these visits not only strengthened her ties to Mexico, but they also increased in her an awareness of difference in this new setting, of being American, rather than Mexican: "But when I went to Mexico City to stay with relatives it was different and I realized I really was Americanized." One of such Americanized ways of being was Dominic's preference of English over Spanish to communicate with her friends, her sister, and parents. However, as is typical of many first generation immigrants, Spanish was used in the household for the purpose of communicating with frequent visiting relatives. Dominic also used Spanish with her sister in public spaces for specific purposes, "like when we're out at the mall, we don't want people to know what we're saying, we'll talk in Spanish" [Dominic-Interview-8.24.93]. These practices and Dominic's interest in continuing learning Spanish were both indicators of the family's support of bilingualism.

Over the course of her life, Dominic used different labels to identify her cultural identity. First, she adopted the label Hispanic, an ethnic qualifier she attributed to people of her "own race":

Well, we call ourselves Hispanic. I don't think that people of, you know, not Spanish speaking I don't think they use that term that much. That may be just my opinion. My own people of my own race use it. I think people who don't speak Spanish they say Mexican or Spanish just like we might say Chinese instead of Oriental.

[Dominic-Interview-8.24.93]

In her narratives, Dominic used the borders of race to group her "own people" under one common racial origin. This was quite interesting to me because Dominic's fair skin did not match the dark bronze skin tones of girls like Alejandra, Selina, Marisa or Victoria. Like Lupita, Dominic was a girl who could pass as White. However, her sense of

racial identity seemed rooted in Dominic's bonds to an Indian culture honored consciously in her choice of Chicana as her ethnic label. Dominic described the process of claiming her own ethnicity in a brief story where she attributed her self-chosen Chicana identity to a growing knowledge of Mexican history and a political decision to show support towards her Aztec ancestors:

When people ask me what I am, I never think of saying Latina... But, that just seems like a broad, a broad definition, too, like Hispanic. I used to call myself Hispanic, and now I call myself Chicana, because, I found out that Chicana is, I've heard lots of different definitions of that. Chicana is, from Michica, like Mexican, but Michica, from Aztec. So that, to me by using the term Chicana it's, uhm... it's like showing support to, you know, the Aztecs, to your ancestors, showing that that's where you come from. So, when people ask me what I am, I usually say Mexican or Chicana, or both.

[Dominic-Interview-8.24.93]

As Dominic sorted out the different meanings of the terms Hispanic and Chicana, she captured the ways her social identity has been forged by time and place, changing from Hispanic, a "broad definition," to an identity which connected her to a group in the U.S. that has politicized the notion of race and rendered different meanings to ethnicity. Like Lupita, Dominic was aware of her crafting of a Chicano self overtime, as she became affiliated to social groups located within U.S. boundaries. Unlike most other girls in our group, however, Dominic had a unique perspective on the meaning of ethnicity from a broader international location:

I think that people don't understand there's more than one, you know, Spanish speaking, group /?/. Because, like, there's lots, Puerto Rican, like everything, Spanish. They don't know the difference between Spanish and Mexican, you know? And people just see, like, Mexican. Like people say for Asian people it's just Chinese, stuff like that. It wouldn't hurt me [to be called Spanish] but I think it's ignorance because people need to learn that there is really a big difference and people ask me and I tell them it's very easy because Spanish are from Spain and people that are Mexican are from Mexico...and lots of different things to Cuban people, just like we were talking about last time, there's lots of different things just like there's different Orientals, things like that. I think that's important for people if they have respect for their own culture that they should have respect for other cultures.

[Dominic-Interview 8.24.93]

The length and depth of my conversations with Dominic about ethnic identity were not paralleled in our talk about gender. This pattern marked a sharp contrast with girls like Lupita, whose interviews and conversations often raised the borders of gender as a marker of experience and an explanation for a number of problems. Dominic spoke about the process of becoming a woman in relation to an individual's ability to face responsibilities and mature.

Dominic: I would think it's from the inside, not from the outside. I think it's a lot of maturing and being responsible. And I still have a lot of ways to mature. And I still have to accept a lot responsibilities. So I don't think there's a certain age because some girls are like forced to become women earlier you know if they have sisters or brothers that they have to take care of and they have to mature a lot faster. For me it's never been that way. But I don't think it's from the outside when you start growing or whatever that makes you a woman, I think it's from the inside. It's maturing and growing up from the inside.

Constanza: What kinds of responsibilities are you thinking about?

Dominic: Just daily things like driving a car, paying bills and things like that...I don't think that you can handle responsibility unless you are mature. I don't think like one day you just like say I am a woman today. It comes eventually all the responsibility you have to learn to mature.

I am still sorting out the meaning of terms like maturing and responsibility, so often connected to notions of growing up, and understood as a goal of complying to societal norms. For Dominic, in particular, lack of maturity became an explanation for her under achievement in school and her wandering moments while she attended her freshman year at Burlington High School.² Her mother frequently remarked that Dominic was not using her full potential at school, a sign of lack of maturity, and she often approached teachers on her own asking for explanations, suggestions, and strategies intended to help her daughter. Dominic's interest in school seemed poor, at best, and she recalled having a G.P.A. close to 3.0, one which she believed to be low, considering her self-expectations and those of

² In 1994 Burlington High School reported a total student population of 1480 students: American Indian 1%, Black 47%; Asian 4%, Hispanic 7%, White 42%; a male/female ratio among Hispanics of 48/53. The percentage of students with satisfactory scores on the MEAP test reported for 1993-1994 were: math 20.3, and science 37.6. The percentage of students whose financial resources made them eligible for free and reduced lunch was 30.5%.

her parents. During the school year Dominic was grounded several times for getting low grades, specifically in science. Apparently, Dominic had very little interest in school subjects, although she recognized that schooling provided some valuable knowledge which was helpful. When I asked her why she went to school, Dominic responded with a quick, "I have to," followed by a commentary, "No" [Laughter]. Then she proceeded:

Lots of times kids say that they don't, they don't need school, they know everything they need to know. Whenever I look back on what I've learned, it's a lot of things, and it's helped me a lot, you know, but, you know, sometimes you learn something in school and you say, 'How can this help me? I'll never need to use this method.' And then sometimes you find yourself using it.

[Dominic-Interview-7.15.93]

Rather than an absence of parental support, poor academic abilities, or skills, Dominic's apparent lack of interest in schooling seemed to be related to a feeling she often labeled as "boring." Boredom was a theme she used frequently to qualify her experiences in science, where she claimed to know everything being taught on her last year in middle school:

The class was easy for me. I could easily have just done it but the reason I didn't get good grades is because it was so easy and I didn't even want to bother with it because it was really boring. That's a problem I have too. So it was easy to understand it and it would have been easy for me to get like an A in there with a little bit of effort but I didn't just because I already knew everything I was concentrating on my other classes that were more challenging and I didn't worry about science. Cause I was like, "Oh, I know everything in science." So that's why I didn't participate in it that much except for what I had to do, to get you, know without me failing, and my interest was [low] because everything was from the book and he wrote on the board exactly what we were going to do and he never left time for kids to talk about it you know it was like we were having a conversation and he'd say, "Get on it cause we have to do this and this."

[Dominic-Interview-7.15.93]

Being a curious and active person, Dominic's lack of engagement in school was quite perplexing until she began to describe her feelings of boredom, which in her view accounted for her poor academic outcomes. Interestingly, she described her teacher's traditional methods of basing the lesson on the textbook and writing on the board to be the causes of her boredom. Dominic also pointed at the absence of conversation about the topics she was studying, as a missing, or at best a brief component, of science class

interactions. Dominic's descriptions of herself in science located much of the responsibility of engagement in the hands of her teacher who was expected to use different methods to spark attention and maintain her interest in the subject.

In addition to the support she received at home, Dominic topped her self pride and confidence when she talked about herself as a strong and capable person with career plans and a positive outlook at the future:

Constanza: What are your plans for the future?

Dominic: To be a respiratory therapist and an actress.

Constanza: ...And you think science is going to help you meet those goals?

Dominic: Definitely respiratory therapist cause you know it's all involved. But uhm being an actress, well yeah. Cause science like I said it has do with everything so if I'm an actress then there's all sorts of things involved like uhm...I don't know everything is science...everything you can think of there's science involved.

Dominic's outlook on the future sketches an interesting combination of obstacles and opportunities for the career woman she foresees:

Constanza: What opportunities are available to you because you are a woman? A Mexican?

Dominic: Yeah, there's lots of jobs because sometimes people...I haven't really decided if that's bad or good, but sometimes people like if a man and a woman came to apply for a job and they both had the same skills and qualifications but the woman got the job just because she was a woman, then, I don't know it that's really bad, but you know it's also for the sake of the company to say we have Hispanics working here and we have all different races and we have men and women, so I think there are opportunities for the women. [As a Mexican] I think it's the same thing, because people want to hire instead of like a white man maybe a Mexican woman just to make them look good.

Standing next to this scenario of opportunities, Dominic depicted a struggle where the forces of sexism and racism act against Mexican women:

Dominic: I think some people also think at the same time that they're [women] hard headed and instead of saying well give this one opportunity cause it will make us look good and give her a chance that they say, she can't do it because she's not capable because she's a woman. So, it works both ways, it just depends on /?/

- Constanza: And is that true also for Mexicans?
- Dominic: Uhm-ha-ha I think it's all the same thing. The minorities. I think it's all /?/. I can't really say though, because I'm not really in the work force or anything. That's how it appears.
- Constanza: And what issues would come up if you are a Mexican looking for a job. You mentioned that for women it would be things like she is not capable.
- Dominic: Maybe the same kind of things. She doesn't belong in the office she belongs maybe at...up in the fields or something like that because she's Mexican. Or that uhm you know if we can't communicate with her, well she only speaks Spanish, or if we can't understand her or if she can't read.

With these hypothetical examples, Dominic brought to the surface a bundle of stereotypical images that reveal some level of awareness of future obstacles and opportunities. When Dominic talked about the potential scenario of a Mexican woman looking for a job, she alluded to a stereotypical image of the Mexican worker in the fields, as opposed to the office; she mentioned communication barriers growing out of the belief that Mexicans can only speak Spanish and hinted at the suspicion that "she can't read," a stereotypical image of the ignorant Mexican. The image of hard headed women judged as incapable in work settings where employers adopt policies designed to "make them look good" is, in a nutshell, a representation of the implementation of affirmative action policies viewed from the perspective of a Mexican adolescent girl who looks at the future with a few words of hope and serious skepticism.

Dominic's narratives talked about shaping her ethnic, racial and gender identities at the border, between two countries, between being an adolescent and becoming a woman, between an understanding of a culture of pride and a culture that is demeaned in racialized terms. Listening to Dominic's narratives I learned about the need to connect students' understanding of culture and race to their learning experiences. Dominic's narratives poignantly described oppressive forces which shape schooling experiences, but they also hinted at personal responses to schooling, in particular to science, which appalled everyone who believed in Dominic's potential. Interestingly, Dominic had the economic conditions,

parental support and academic skills that predict success as a student; however, Dominic recognized her position of marginality in her school setting. In the next chapter I continue an exploration of Dominic's "student" identity for it revealed important insights about the process of schooling and underscored the need to transform "student" identities that reinforce and reproduce their marginal positions in the classroom.

Chapter 6

THE BEANS OF LIFE AND CURRICULAR BOUNDARIES

The search for the meaning of science in the lives of girls of Mexican origin demanded that we carved out a space for science in our conversations. In previous chapters I have reflected upon the tension between having conversations "for" science and having conversations where we focused on various topics related to students' life in schools. I justified the direction of our conversations towards the thematic pattern of science and issues related to the meaning of science, given that science was a required subject for all participants in this project. In chapter 5, I provided evidence that science had a meaningful place in students' daily lives, sometimes connected to its trade value, future benefits, or in the shaping of an individual's identity.

In this chapter I will focus on one conversation where I intended participants to share ideas about the meaning of science. The strategies I used to guide our talk included consideration of environmental conditions. For instance, during a group visit to a science museum, I asked the girls to record on tape their reactions to the exhibits with which they were interacting. As they narrated their encounters with each exhibit, they were asked to qualify the exhibit and tell me if it connected to their lives.

Another strategy to gear our conversations towards science was to conduct experiments related to the science curriculum. This connection between our group meetings and science content was driven by questions generated during our talk under the rather obvious "What happened in science today?" This question was introduced as a routine to begin our conversation sessions, where we went around a circle eliciting stories about school science from each participant.

In retrospect, I see most of these attempts as fruitless efforts to bring to the foreground the voices of girls who viewed themselves as marginal in science and who were not frequent vocal participants in our group conversations. Girls like Magda, and often Marisa, were not drawn to talk about science by being placed in environments where they

encountered science related activities. Getting them to engage in the thematic pattern of science, or simply to talk about it as a meaningful experience, was particularly challenging in my encounters with Magda, a girl whose voice was seldom heard in our group conversations or one-on-one interviews.

In the first part of this chapter I will focus on one key conversation which became an important point of reference from which I began to listen to Magda's possibilities of connection to science. After this conversation I also came to think of science as a kind of intellectual space where students can engage in critical analysis about the meaning of subject matter in their lives. As the reader will see, the dialogue between Magda and Marisa raised important strategic and pedagogical questions regarding the process of listening to voices of marginal people. It also opened avenues of possibility for students to establish connections with science in their schools and, above all, to critique science as a space contained within the structure of schooling.

As both listener and interpreter I place the dialogue between Magda and Marisa in a central position in this dissertation, as it offers a rich set of narratives that inspire multiple possibilities for change in the ways we construct school science. In the chapter's second half, I explore the possibilities for a different science that places identities at the center of science teaching.

One strategy I used to bring into our private talks the voices of participants who talked less frequently in our large group meetings was to ask the girls in our conversation group to pair off and interview each other. I hoped that in this configuration the voices of girls who appeared marginal in our conversations and those of girls who placed themselves in positions with no apparent connection to the content of school science would be more salient. I asked each pair of girls to take turns asking the following question: "What is science for you? What does it mean to you?"

Science In A Dialogue¹

"It was borin'"

Magda, a girl whose voice was so often silent, paired herself with Marisa, a person who, though she often remained quiet in our conversation group, appeared to be a good listener. The following excerpt from their dialogue illustrates how Magda described a notion of science very much bound by the limits of school and reduced to a nullifying experience summed up in her own words as "nothin':"

Marisa: Okay, Magda, what do you think about science, what do you think.

Magda: Nothin'. It's borin'. Sometimes it's borin'.

Marisa: Is. . . that all?

Magda: Yeah, and it's borin' and fun. All we get to do is watch movies and movies and movies and it's boring. Movies is about history.. . . /?/. There's nothing else. It's just boring. We sit there and just write and write and write. Until the end of the until the end of the year we get to do practice and stuff. That's what he tol'us. I'm like... not good. You just write and write. Just boring. Watch movies about history. . That's it. We don't do nothin" in that class...

It is important to underscore that Magda interpreted the question of the meaning of science, an admittedly very broad domain, by locating science solely within the narrow space of school experiences. It was painfully obvious from her description that other ways of connecting with science that I knew were available to students in Cedarville, such as enrichment and after school programs, were left out from the realm of Magda's experience. Primarily due to the family's lack of resources, Magda's mother had difficulties providing transportation to enable Magda to attend these programs. Magda was also constrained by what she described as an unfair distribution of duties and privileges at home, where she

¹ In this chapter I use the notion of dialogue both as a strategy and process of knowing. As Paulo Freire and Donaldo Macedo (1995) argue in *A Dialogue, Culture, Language and Race*, it is important to mark the difference between dialogue as conversation that focuses on individual lived experience and dialogue as a process of learning and knowing. In the first sense, I used the notion of dialogue as a way of engaging participants in conversations about the meaning of science in their lives. In the second instance, I use dialogue as a process of examining experiences in critical ways. I agree with Freire and Macedo in their distinction that dialogue as a strategy to get the conversation going is not the same as a process of "coming to voice," a term bell hooks (1989) uses to talk about acts of resistance, an affirmation of struggle. hooks reminds us that "to make the liberated voice, one must confront the issue of audience-we must know to whom we speak." (p.15)

was responsible for nearly all the daily home chores. By contrast, Marisa had been attending an after school program that met in her middle school building once a week. However, her participation in after school programs like this one was also constrained by home duties like child care. For both girls, their mothers' participation in the labor force did not support them in interrupting patriarchal relations of power. On the contrary, as adolescents, these girls were expected to at least partially replace traditional mothers' roles at home.

In the brief description that Magda offered as a response to Marisa's inquiry: "What do you think of science?" I heard in Magda's voice the repetitive pattern of nothingness she so often used to describe her experiences in classroom science each week, as can be seen in *Table 5*, with an accentuated emphasis:

Just as with so many other times when our conversations were geared towards constructing stories about science in the classroom, Magda described her school experiences as dull and boring in her dialogue with Marisa. Not unlike me, Marisa was intrigued by the meaning of "nothin'" so often brought into Magda's stories about science class, as evidenced in her insistent line of questioning. Throughout this dialogue, Marisa probed in apparent disbelief, as if digging beyond the surface tales of nothingness for some semblance of learning in Magda's stories:

Marisa: You don't learn anything about history?

Magda: In science he teaches, he puts a movie about history. These movies about history, India and Egypt, that's it!

Marisa: Did you learn anything more than what you knew before.

Magda: No that was the same thin' he showed me last year. He was my teacher. He taught sixth, seventh... seventh and eighth grade last year. But now he teach eighth grade.. But last year it was more fun. But this year it's boring. Until the end of the year we get to do stuff. We get to have fun. That's what he's saying until he gets all his materials. It's boring. Now your turn.

Table 5
Magda's Science: Doing Nothing

10.29.94	11.5.94	11.12.94
Constanza: Let's move to Magda. [Ref.: What happened in science today?] Magda: We had a test. Constanza: You had a test? You have a lot of tests. ... Magda: It was boring... We're not doing nothing.	Constanza: What happened in science? Magda: Nothin', we just watched a movie. Constanza: You watched a movie? About? Magda: About history. That's all we did, we watched a movie. Constanza: The whole week? Magda: Yeah. Constanza: Do you know what chapter you're in? Magda: We're not using the book. We only used it once.	Constanza: Did you say what you did this week in science? Magda: No. Nothin' we talked about water vapor.

Magda's description of science as "nothin'" appeared to be rooted in her belief that history had no place in the assigned space of science class. Her description suggested that, in the context of schooling, she was aware of disciplinary boundaries that delineated the distinction between movie that were appropriate in the space of history as opposed to science. But beyond the issue of what Magda considered appropriate content for the science classroom, she also brought up another level of nothingness she defined as lack of "practice" and having to wait until the end of the year to "get to do stuff."

Making Connections: "Science is Everything"

As the dialogue continued Marisa and Magda took a brief adolescent detour through the topic of pimples, which I did not transcribe. Then, they returned to the task of interviewing each other about the meaning of science:

- Marisa: Now your turn. Okay.
- Magda: The same thing you asked me. What is science like.
- Marisa: What?
- Magda: [Raising her voice.] What is science like?
- Marisa: It means to me, well...It's learning about things and... like we have plants, today like we are studying the thing that we had talked about earlier, the petri dish and the green seed grass seeds.
- Magda: We did something like that. Last year we did.
- Marisa: And then we're gonna see how it works in different kinds of temperatures, so right now we're just talking about different kinds of temperatures how. . .how. . .different you know what temperature would seeds grow in and we're talking about that and last week we were talking about.. no earlier this week we were talking about how. . .how a green plant produces food or how a. . . how animal gets its food.

Marisa had already described her experiment in our group conversation, when I asked her to tell us what happened in science. Interestingly the two accounts of her experience were strikingly different. Let us take a brief look at the first narrative:

- Marisa: Today what we did in science we took like a petri dish and we had some. . .no..not meal worms we did that a long time ago.
- Victoria: Oh you took the tomato seeds and you put them in an incubator.

Alejandra: Ex-cuse me, is your name Marisa?

Victoria: I was helping her out.

Marisa: [Pulled out notes to talk about what she did today]. We took some paper toweling and we wet it and we put it in a petri dish and then we put some. . grass seeds on it and we spread it around so that there wouldn't all be together and then we hmm...then we had to write like ah...ah...ah...no, what the purpose was and what the steps were [laughter] and then we had to write what we needed and we need grass seeds and there is [laughter]...

Constanza: So you were saying you wrote down the purpose and the

Marisa: The purpose ...the purpose was ah...[reading from her notes] to find how the seeds would grow in different kinds of temperatures and then mm...and then we had to have all these items...I wrote them down thirty grass seeds, three petri dishes for each group we each had three people in it. Three or more.

I listened carefully to both of Magda's narratives about experience in science class (see *Table 6*) and I noticed an interesting contrast between the first and second times she told her story. While her first narrative was characterized by hesitations and interruptions, in the retelling of her story Marisa spoke more fluently and with greater ease. She was even able to dispense with the class notes she had used earlier when speaking to the group. In this second narrative, Marisa articulated a clear understanding of the purpose of her experiment, even without prompting. This more confident retelling of her first story revealed that Marisa had not only become more knowledgeable about the experience she had on that day, but that she could now make connections with lessons she experienced the week before.

The above narratives speak to the power of conversations in the science classroom. The different qualities of each narrative suggest that narratives elicited in conversations where girls focus on the meaning of science can be turned into effective strategies to help them organize their experiences and find a sense of purpose in the experiments they perform in science. This finding also suggests that conversations may help students to make connections with science that would otherwise be nonexistent. As the dialogue

Table 6	
Making Connections in Conversations About Science	
First Narrative	Second Narrative
Marisa: Today what we did in science we took like a petri dish and we had some. . .no..not meal worms we did that a long time ago. Victoria: Oh you took the tomato seeds and you put them in an incubator. Alejandra: Ex-cuse me, is your name Marisa? Victoria: I was helping her out. Marisa: [Pulled out notes to talk about what she did today]. We took some paper toweling and we wet it and we put it in a petri dish and then we put some. . .grass seeds on it and we spread it around so that there wouldn't all be together and then we hmm...then we had to write like ah...ah...ah...no, what the purpose was and what the steps were [laughter] and then we had to write what we needed and we need grass seeds and there is [laughter]... [...] Constanza: So you were saying you wrote down the purpose and the.. Marisa: The purpose ...the purpose was ah...[reading from her notes] to find how the seeds would grow in different kinds of temperatures and then hmm...and then we had to have all these items...I wrote them down thirty grass seeds, three petri dishes for each group we each had three people in it. Three or more.	Marisa: And then we're gonna see how it works in different kinds of temperatures, so right now we're just talking about different kinds of temperatures how. . .how. . .different you know what temperature would seeds grow in and we're talking about that and last week we were talking about.. no earlier this week we were talking about how. . .how a green plant produces food or how a . . . how animal gets its food.

between Magda and Marisa continued, the point that the dialogue enables connections between science and lived experience was strengthened even further as follows:

- Magda:** I have some seeds but they were hmm they were a devil beans it was they were hmm have you seen them beans but they're all red.
- Marisa:** Oh yeah, those beans that are red.
- Magda:** Yeah in my country we have we have a tree that grows those beans.
- Marisa:** What country you come from?
- Magda:** Mexico. In my house I have a big tree that got those ahhh red beans and they can there's like the seed you open that thing and you just take them out. They're poison. Those beans are poison. You could cook 'em. It was not the same but they're poison if somebody eat them yah, you get killed.. well not really, you get sick.

As Magda built upon Marisa's story, she connected the experience of growing curricular beans, in her science classroom, to the beans she knew from her childhood. Marisa listened, as shown by her inquiries about Magda's country of origin; however, she responded in a way that I would expect from a teacher in the science classroom, as if the folk knowledge contained in Magda's beans interfered with her traditional notions of science. Marisa pulled the conversation back to "science" by interjecting:

- Marisa:** Well hmm Well I think that science is about...what is science about, let me see. . .About different ways of the earth..uhm you know like why and how does the earth turns.

Magda, in turn, appeared reluctant to abandon her folk beans, the ones she carried so close to her, not only in her memories, but in a back pack that she reached with her hand to grab a sample for Marisa's inspection:

- Magda:** I think I have one. [Ref. beans in her back pack]. Like these beans. See? They give you good luck.
- Marisa:** That's not a bean.
- Magda:** Well, whatever.
- Marisa:** Oh, it is.
- Magda:** It's a bean, but they're poison. That's what my mom, that's what my dad said. But they give you good luck in my country house I have a tree. Me and my aunt. That's the only tree they have, the only tree. I think I have a picture, actually that's my brother's picture.

/?/.She loves my brother...[Magda continues searching into her back pack].

Marisa: Okay. and. . .And something else about science is, dang money? [Ref. content in Magda's back pack.]

Magda: I got two, two dollars. I got some money I got...thirty-five dollars. After a thorough search into Magda's bag, Marisa brought back the word science once more, in an apparent attempt to bring it to the center of their dialogue:

Marisa: I think science is everything though. Almost everything does have to do with science

Magda: With science. Well history how can history be science.

Marisa: History is sort of like science, but it's like uhm, history can get it from hmm history class.

Magda: /?/ Yeah, but he just shows a movie about history /?/

Marisa: Well, yea, it's real science too because you can find out more about how they used stuff back then that we can not use any more. And stuff that they did use that we didn't know about. I don't know. . Last week or either Tuesday we watched this movie about sharks

Throughout this dialogue Marisa highlighted a most interesting tension between the belief that science covers every form of knowledge, and an opposing view, based on Magda's experience of science as "nothin'." With a blanket assertion, "I think science is everything though. Almost everything does have to do with science," Marisa covered the realm of all knowledge under the broad umbrella of science. This assertion was challenged by Magda who saw history belonging in a different venue: "Well history, how can history be science?" Interestingly, Marisa contemplated the possibility of connecting science and history with allusions to the ways both disciplines allow us to learn about the past. Her brief comparison, though, did not lead to an otherwise insightful analysis across both disciplines; rather Marisa took the issue of content back to the conversation: "Last week or either Tuesday we watched this movie about sharks," Both girls agreed this kind of movie belonged in the space of the science classroom.

As the conversation continued, it seemed as if Marisa gave way to the belief that Magda was not learning science at school and insisted that she talk to her teacher about it.

Interestingly, Marisa offered a justification which summed up her appreciation of science as a meaningful subject that offers future benefits, not unlike the ways we heard her talk about grades in the last chapter:

Marisa: Well in the future you're gonna have to know science 'cause people are gonna ask you questions. More questions about the earth or something. You know, how little kids are, you know if you have a baby or something, you know they're gonna ask you right away.

Magda: Yeah but. . .if you have kids. . .Like. . .I don't. . . So, speak speak.

Magda's last sentence alluded to her determined assertion that she did not envision children as an inevitable part of her future. By dismissing the thought of being accountable to children in the future, she appeared to throw the ball back to Marisa who, in turn, seemed to be pulling for arguments to locate science in Magda's life. As if fishing for something that was not there, Marisa ran through a laundry list of topics in an attempt to help Magda see the ubiquitous presence of science in her lived experiences:

Marisa: You did not learn anything at all this year?

Magda: Not yet . . .

Marisa: What do you think about the tropical rain forest do you think that there's unusual animals in there? Or, you know, /?/ brought it up.

Magda: We didn't learn it last year. We did not learn it in sixth grade, not in seventh grade, not in eighth grade. We haven't learned rain forest, we never did. I never learned that when I was in elementary school, we never did.

Marisa: Tropical rain forest?

Magda: No, we never did. Not in fourth grade, not in fifth grade, not in sixth, seventh and eighth. We never did that.

Marisa: What about have you ever found any shells on the beach or anything when you were *in your country*.

By placing science "in your country," where Magda's bulk of childhood experiences took place, Marisa searched for the meaning of science in a particular context that she had just learned was meaningful to Magda. s shown in the continuation of this

dialogue, Marisa's mention of "*your country*" seemed to be the trigger that released a stream of memories which led the dialogue in multiple directions:

- Magda: My brother went to Acapulco. My brother went twice when my dad had to rent /?/. He took him twice and me and my mom had to stay home. . .my brother brought some shells and stuff, he brought them, some of them were bright.
- Marisa: You see, there is *science* right there.
- Magda: Yeah but he swam. . he found more of those shells, he said he saw a shark it was like an ice cube, but there was a shark in there while he was in the water. He said that that was plastic but the shark was there. . .He collect those shells then he ate something that yak!! You know turtle eggs? He ate turtle eggs. He ate them, he ate them and then he got sick by that. He came home sick. He looked for shells and stuff and . . .
- Marisa: What about *animals food*. What do you know about animals food how they *digest* it or whatever, you know.
- Magda: Dogs eat anything.
- Marisa: How about. . .let me see
- Magda: I used to have two dogs they eat anything one time when I was a little girl I would never eat, I never drink my milk, and one time I went outside I went outside and I was finding my dog and I gave him my milk. I was pouring it on the ground he would drink it all and then my mom, my brother and my mom said: "What are you doing?" /?/ I got in trouble. /?/
- Marisa: So you don't think *science* is anything to you or if it's gonna be anything to you?
- Magda: Not really. . . it's boring right now. It's kind of boring right now. He said he's gonna make it fun. But. . . but. . . so. . . I don't know. . . I don't know what I'm gonna do with it this year.

Apparently, Marisa's broad umbrella of science represented in these narratives was at once too big and yet not wide enough to offer shelter to the various experiences portrayed in Magda's tales about growing devil beans, swimming in Acapulco, and dogs drinking milk. In her efforts to stretch the umbrella of science, Marisa continued through the end of this dialogue, as if pulling information from Magda searching for connections between her lived experiences and science.

- Marisa: Talk
- Magda: I'm, speaking.
- Marisa: You talk, I've said a lot of stuff.
- Magda: Well like what.
- Marisa: Like how. . .you know I said all that stuff.
- Magda: Yeah, but that's not much, I said more than you, see I'm talking.
- Marisa: No, I said more than you. I said more than what you said.
- Magda: /?/ You got talk now. . .These *beans* grow my mom grows 'em and it's about this tall it's a tree. This come from a tree.
- Marisa: See? There you go, a tree, how do they grow? What, you know.
- Magda: Just put it on the ground with dirt. And you put water on it and it grows. That's it. That's what my mom did. And it worked.
- Marisa: /?/ Sunlight.
- Magda: Well. It does, it needs sunlight and water /?/ straight.
- Marisa: How do you keep the plant straight?
- Magda: Just tie it, just tie it straight around the tree and then you just, then you put it on the ground with the stick so it won't go. . . no where. These. . .my dad said that these are poison. People cook'em /?/ it smells the same but when you eat them it tastes different. Well...

At last, by the end of this excerpt, Marisa and Magda initiated a conversation which connected the experience of growing beans at home and the topic of plant growth that both Magda and Marisa had studied in science class: "Just put it on the ground with dirt. And you put water on it and it grows. That's it. That's what my mom did. And it worked." Marisa added "sunlight," recognizing the list of factors identified in Magda's narrative was incomplete. Magda, added, as if correcting herself: "Well. It does, it needs sunlight and water and a rope to keep it /?/ straight."

The kind of conversation held by Marisa and Magda was conducive to making connections with science, moving both girls from a position of marginality to a central position where Magda's lived experiences were incorporated into the conversation as part of the knowledge one needs to grow beans. Until this conversation took place, I had not

heard Magda speak about any other connections between big ideas in science and her personal life. Magda's narrative about growing beans at home illustrated a movement from "nothin'" to an initiation of a conversation that touched on biological principles, namely the environmental factors that plants need to grow.

The conversation between Marisa and Magda exemplified the ways dialogue can be used as a strategy to foster understanding of the purpose of a science experiment, as illustrated in Marisa's narratives about her experiences in science. It also revealed the ways two students constructed connections between lived experience and science content, in spite of their marginal positions in science, as represented by their low grades and their teachers' perception of lack of engagement in science class, and evidenced in my own perceptions of these students' participation in science class.

That narratives of lived experience in dialogical encounters have the potential to support connections to science and foster understanding of scientific concepts justifies the introduction of dialogue about lived experience in the science classroom. This finding is consistent with the fundamental assumption that learning is a social activity in which learners are engaged in constructing meaning through discussions and negotiations, a premise which informs current constructivist approaches to science teaching (Maor & Taylor, 1995; Bezzi, 1996). The dialogue between Magda and Marisa makes a case for providing spaces in the course of a science lesson for the enactment of dialogues about the meaning of science. These encounters, as the above example suggests, would support students in the process of making sense of attending science class as a meaningful action for all students, but in particular those who might stand in positions of alienation in science.

We could leave the analysis of this dialogue at this point, and justify the presence of encounters such as the one between Marisa and Magda in science classrooms by claiming that their conversation provided spaces for voice, thus successfully achieving the goal of bringing both girls' experiences to the center of this study, or in a potential situation, to the

center of a science lesson. However, even though it is true that these girls' narratives of experience were central to their dialogue, I do not believe that just voicing those experiences represents a meaningful move towards an understanding of the place of science in their lives, and most importantly, towards the construction of identities that are not marginal. The dialogue, I believe, needs to be taken further.

Where to go with a dialogue such as Marisa and Magda's? This becomes a fundamental question that distinguishes a practice of science teaching and learning grounded in feminist/critical pedagogies, in pedagogies of hope and engagement, from other approaches which place conceptual understanding at the center of all educational endeavors.

De-Centering Science, A Pedagogy of Possibilities

Without undermining the importance of conceptual understanding, I read the collective narratives in this dissertation as calls for a practice of critical/feminist pedagogy in science teaching which centers around identities. I do not intend here to assume a unified, static definition of critical and feminist pedagogies, but I will briefly sketch some assumptions I borrow from scholars in both fields to inform this vision of a pedagogy of possibilities in science.

Critical pedagogy is influenced by the work of those who critique and interpret pedagogy in its wider sense, including curriculum, social relationships in the classroom, and the ways in which the classroom reflects the larger social context." (Weiler, 1992, p. 3). Feminist pedagogy, more specifically the standpoint of poststructuralist feminism, reads pedagogical encounters and pedagogical texts both as a "politics of signification and as historically contingent cultural practice." (Luke & Gore, 1992, p. 4). This latter position reads texts, classrooms, and identities as the inscriptions of discourses on material bodies/subjectivities. (*ibid.*).

The following exploration of a pedagogy that centers on the identities of our students draws ideas from both critical and feminist approaches to pedagogy. However,

this foundation is rooted in the problematic, if not contradictory position that poststructuralist focus on "the deconstruction of taken-for-granted historical structures of socio-cultural organization within which various versions of the "individual" have been inserted." (*ibid.*, p. 5). Thus, the poststructuralist standpoint takes issue with the taken for granted categories like gender, race and ethnicity which are used throughout this text to talk about the participants in this study. In this section I explore the meaning of pedagogical alternatives that center on ascribed identities like race, gender, and ethnicity not because I assume these categories uncritically, but because they constitute a central component of the narratives about school experiences constructed by girls of Mexican origin.

I bring to this chapter excerpts from various texts. I begin by intertwining Marisa and Magda's voices with the official curriculum, as exemplified in an excerpt from the textbook adopted in Cedarville School District. The text I selected focuses on the activity of growing beans, the living plants that Magda brought to her dialogue with Marisa. I then turn to the pages of Chicano literature, trespassing disciplinary boundaries of science to look at beans from yet another perspective; one that places beans, the objects of knowledge of science, within a historical process of Chicano struggle. I close this chapter by bringing back to the center of the dissertation narratives about life in school, where beans are used as symbolic representations of identity within a system of racist ideology.

Curricular Beans: Growing the Biggest and the Best

"What would you recommend to a future bean grower?" This question is posed as a way of evaluating the results of an exploration on plant growth in the science textbook adopted in Cedarville School District:

This is a long-term project. Your objective is to find out what it takes to grow the biggest and the best plant in the classroom. You will find out how to get the best results in each of these areas:

- Type of plant to use (Bean, Radish, Mustard)
- Type of soil
- Amount of water
- Amount of sunlight
- Temperature
- Distance between plants

Size of container
Fertilizer

As you start this project you will need to organize your activities... Your class is going to investigate the effect of five variables on the growth of three types of plants. How will you judge the amount of plant growth?...Here are some factors to consider:

Height of plant above the ground
Number of leaves
Size of leaves
Greenness of plant

[From Science Plus, 1993, p. 459]

Magda's narratives about devil beans and mother grown beans make a sharp contrast if compared to science textbooks where beans become mere objects to measure, dissect, submit to experimental conditions, and write about them in lab reports. Let us attempt to listen once more to Magda's voice in her narratives about beans:

Magda: It's a bean, but they're poison. That's what my mom, that's what my dad said. But they give you good luck in my country house I have a tree. Me and my aunt. That's the only tree they have, the only tree. I think I have a picture, actually that's my brother's picture. /?/.She loves my brother...[Magda continues searching into her back pack].

Against the text that guides her curriculum, Magda's beans, the ones grown by her mother and father, lucky beans, and devil beans from her homeland, become objects waiting to be treated under experimental conditions in the "long-term project" of her science textbook. Curricular beans, the ones students and teachers grow for the sake of knowledge scientific knowledge, the ones bound by the authority of the teacher and the science curriculum, are detached from the living beans that grew in Magda's "country house" on the other side of the border. Magda's narratives about her experiences in and out of school science re-asserted my contention that there is a world of difference between curricular beans and living beans, the ones to which she could relate. Let us listen one more time to what Magda had to say about the ways beans grow:

Magda: Just put it on the ground with dirt. And you put water on it and it grows. That's it. That's what my mom did. And it worked.

Marisa: /?/ Sunlight.

- Magda: Well. It does, it needs sunlight and water /?/ straight.
- Marisa: How do you keep the plant straight?
- Magda: Just tie it, just tie it straight around the tree and then you just, then you put it on the ground with the stick so it won't go. . . no where. These. . .my dad said that these are poison. People cook'em /?/ it smells the same but when you eat them it tastes different. Well...

It would be easy to dismiss the simplicity of Magda's formula, "Just put it on the ground with dirt. And you put water on it and it grows. That's it. That's what my mom did. And it worked" as a scientific response in most science classrooms. At best, in classrooms where students' ideas are taken into account, Magda's formula could be heard against the narratives of science, and used as a springboard to engage in a process of conceptual change. The dialogue would then be directed towards an exploration of environmental conditions for plant growth; another direction might be to link the dialogue to the thematic pattern of photosynthesis, ecology, radiation, or earth science. Science teachers and educators who endorse teaching practice that centers around conceptual understanding emphasize these kinds of connections whereby Magda could be guided to gain a better understanding of the idea that plants make their own food.

Let us pause a moment to think about the transformation of the object of study, the bean, once it enters a curricular space. As isolated objects of knowledge, beans are supposed to enter the classroom space of science without any links to the social contexts where they are grown, or any possible links to the multiple identities of the people who experiment with them. One major transformation suffered by the bean, once it has become an object of study, is its disconnected relation to the students' lives beyond the classroom. The acts of observing, measuring, planting beans, and drawing conclusions are all constrained by the boundaries of the classroom. I would remind the reader that the use of beans in the science classroom is not the exception to this setting where Magda and Marisa study science, but rather the rule. Bean's rapid growth, low costs, and minimum care have made them useful to perform multiple experiments and activities in science labs around the

world. Their seeds, separated and sized with precision, provide a convenient display of embryos and cotyledons neatly arranged for an inquiring science student. Beans are successfully used in science classrooms as simple devices to display structure and function of plant parts, to test the effects of diverse environmental conditions on plant growth, and to develop in-depth conceptual understanding of biological principles such as the fundamental idea that plants make their own food (Roth, 1988).

Curricular science also imposes a particular way of positioning subjects and objects of study. Since modern science is grounded in binary opposites, such as the classic subject/object dichotomy, it is assumed we require of students to distance themselves from the objects of study to construct "objective" knowledge in science classrooms. Ironically, after we raise the borders that divide individuals from their objects of study, we demand from them that they re-connect their scientific understandings to their lives by "applying" what they learned to everyday life situations. I have often wondered, if our purpose is to enable students to understand scientific principles so they can inform the ways they live their lives, if we expect them to be able to create webs of knowledge and apply their knowledge to multiple situations, why do we begin by breaking already existing connections to the objects of knowledge?

In the following section I will explore the possibilities of transforming the bean we bring to the curricular space of science classrooms, in ways that strengthen rather than weaken students' personal connections to the objects of study.

Living Beings and Living Beans in Science Classrooms

I am endorsing a pedagogy which does not start and end in classroom activities and texts, but one that connects objects of study to socio-historical contexts, to knowers who have identities and histories that matter. These connections might happen in conversations among students, as they did in Marisa and Magda's dialogue. I suggest that we bring literature texts into the science classroom, as a way of tracing the cultural and historical

binds that connect us, the knowers to the beans, the objects of study in the science classrooms.

In the United States, beans are omnipresent and serve purposes other than meeting a curricular goal in science classrooms. They live on the screens of American movie theaters in films like *The Milagro Beanfield Battle*, a romanticized version of Mexican experience. They are generously spread out on Mexican dishes in ethnic restaurants throughout the country and they grow, among many other worlds, in the literary pages of *Growing Up Chicana/o*:

I went outside and looked out at the fields. There he was. I could see him walking between the rows, his body bent over the little plants, hoe in hand. I walked slowly out to him, trying to think how I could best ask him for the money. There was a cool breeze blowing and a sweet smell of mesquite in the air, but I didn't appreciate it. I kicked at a dirt clod. I wanted that jacket so much. It was more than just being a valedictorian and giving a little thank you speech for the jacket on graduation night. It represented eight years of hard work and expectation. I knew I had to be honest with Grandpa; it was my only chance. . . "Grandpa, I have a big favor to ask you," I said in Spanish, the only language he knew... "Grandpa, this year the principal said the scholarship jacket is not going to be free. It's going to cost fifteen dollars and I have to take the money in tomorrow, otherwise it'll be given to someone else. . . He looked out over the field that was filled with the tiny green bean plants. I waited, desperately hoping he'd say I could have the money. He turned to me and asked quietly, "What does a scholarship jacket mean?" I answered quickly; maybe there was a chance. "It means you've earned it by having the highest grades for eight years and that's why they're giving it to you." He went back to hoeing the weeds that sprang up between the delicate little bean plants. It was a time consuming job; sometimes the small shoots were right next to each other. Finally, he spoke again. "Then if you pay for it, Marta, it's not a scholarship jacket, is it? Tell your principal I will not pay the fifteen dollars."

(Marta Salinas, 1993, p. 127-132)

Marta Salina's voice places us in a world, not far from many school settings throughout the United States, where generations of children learn about their parents' and grandparents' struggles in the fields, and become caught in confrontations with school systems around the nation. Marta Salina's story reminds me of the families of seasonal migrant workers who cover the farmlands near my home every year, appearing and disappearing in silence, leaving no traces of their presence in school curricula.

Even though the content of Marta Salina's story is by no means scientific, what I see in this story is an avenue for connection between historical roots, gender, class and race

locations to examine beans within a broader web of meanings and relations of power. Marta Salina's story would enable all students to connect the object of study, the bean, to historical roots that pertain to every student in any science classroom. A lesson that centers on identities would place the migrant workers in the rural area where I now live, the children who work in the fields picking beans around the world, the farmers and countries that sustain agricultural economies and the consumers, at the center of our inquiry. It would also lead us to fundamental questions concerning the distribution of labor and profits among bean growers. It would lead towards an inquiry about the ways science might be used to change existent material inequalities which place children in fields around the world with plenty of hard work and little education. It would open a range of opportunities to locate farmers in general, and Mexicans in particular, both benefiting and confronting institutions that at once empower and disempower them.

In relation to scientific knowledge, Salina's story also raises an issue of validity which would enrich the experience of growing the biggest and the best beans in important ways. We could ask: Is there a place in science for the knowledge that farmers have gathered over the years? Does it ever appear in the pages of science textbooks? Why do we raise the boundaries of science and exclude the possibility of bringing in experiential knowledge of farmers? What kinds of results would emerge from following the advice of farmers?

By introducing the text from *Growing Up Chicano* into a dissertation "for" science, I am arguing for a place for stories like this one in science classrooms, at the expense of de-centralizing science. I also argue for a place for conversations like the one where Magda and Marisa highlighted a tension between differing notions of science, one that pointed in the direction of a science that encompassed all forms of knowledge, while the other led towards a reduced science of "nothin" or something "fun" or at best, something that excludes certain content, like history, from its domain. The perception of science as a bounded set of activities and topics, which belong in a sort of territory that is

necessarily different from other subjects in school, i.e. history or literature, is not surprising, given the structural compartmentalization of schools by areas. However, I am appalled by the uncritical preservation of borders that we continuously raise in science classrooms. Conversations such as the dialogue between Marisa and Magda could become a starting point in the science classroom to go beyond telling each other about lived experiences, to engage in conversations about the ways knowledge is compartmentalized into "subject matter." Conversations about the nature of subject matter could guide students to inquire about what qualifies as knowledge in a given subject area, who would be identified as knower, and when and why we raise borders between different subjects.

Even more importantly, conversations about the division of knowledge into different areas of study have the potential of contributing significant insights into the process of alienating people from the realm of knowledge. Looking at Marisa and Magda's dialogue against the backdrop of the textbook activity about beans, it struck me to realize the textbook's silencing of identities which were highlighted in conversation. Magda's stories had characters like "me and my aunt," "my dad," "my mom," a woman who had learned to place some beans and a stick in dirt and they grew. By contrast, the experiment on growing the best and the biggest plants relies solely on students' observations that occur within classroom boundaries. It assumes that knowledge generated through the methods of science in science classrooms is the knowledge that counts, privileged knowledge, which in turn informs the practice of growing beans. The textbook fails to recognize the value of grounding science in the accumulated experiences of farmers and migrant workers who would know how to grow the biggest and the best beans.

In the next section I would like to address the issue of pedagogy in its wider sense, one that acknowledges social relationships in the classroom. We will now turn back to the narratives about life at Phillips Middle School, where Magda and Marisa attended school, to gain further insights on the importance of acknowledging connections between knowers and their objects of study.

Living Beans

Beans, in the pages of Science Plus, are removed from the historical and social contexts where they are intended to become the best and biggest. Potentially, in the written text, they prosper in climates of apparent political neutrality, a condition that allows knowers to look at them from the distance. But as the reader will see through the narratives I bring to this section, beans cannot grow in Victoria's, Marisa's, and Magda's school devoid of social meaning. The following story provides a setting for a reading of texts from science textbooks, like *Growing the Biggest and the Best*, in a different light.

In our conversations, Victoria--the only girl in our group who wanted to become a scientist--revealed another set of meanings attached to beans, the objects which presumably grow in science classrooms detached from their socio-political roots. Beans entered Victoria's narratives of experience at her school as symbols evoked in her classroom, when the appearance of a Mexican student seemed to require a label.

The text that follows comes from a conversation where we talked about the names we liked to be called. Our conversation grew into a chain of stories about the experience of being Mexican in U.S. society. Unfortunately, the transcript removes the tone of a passionate voice that got louder as the story progressed and it transforms a vivid image accompanied by non-verbal language into a static, frustrating representation. However, I believe it succeeds to convey the idea that beans can trigger major conflict in classrooms like Victoria's where their sole mention was used to mark racial boundaries and define Victoria's ethnic/racial identity in derogatory ways:

Victoria: ... cause see what happens, like if we...are good in class, then she'll give us a bean. And then when we get 10 beans, we get like a prize, and he goes, "Well, you guys don't need any beans cause you're Mexican, and all you guys are brown, you look like that," so I started.....I, I said, I had to come in, and I had got up, and he like got up and I just was all up in his face about it and everything, cause he was getting me really mad, and then, his friend, he goes, come on man, she's a girl, and I'm like, I don't care if he's a boy, I'll just rip his butt anyways, and like, I got really mad, you know..

Alejandra: Rip...

[Laughter]

Victoria: I got like really mad, and then the people..and then the teacher would be all like settle down, settle down, it's okay, and I'm like, " Well hey you wouldn't take it if any of the guys in here were calling you names and everything."

Dominic I would have gotten up.

Victoria: I could not stop talking and then all my friends were just laughing and other things and they started making me laugh and I was laughing and yelling at him and everything and /?/ I got so mad.

Victoria's story revealed the ways beans would enter her classroom as contextualized objects, connected to symbolic systems that are grounded in racist ideologies. As she spoke, Victoria helped me see that her racial identity was intimately connected to an object of knowledge that is used to demean her. Based on Victoria's story, one would not expect to see science curriculized beans growing in isolation, removed from a symbolic system where they evoke racist practices. If Victoria, or any other girl whose identity is marked with demeaning language, were asked to disconnect herself from an object of study for the purpose of scientific inquiry, there would be ideological constraints that impede her position in the privileged vantage point of scientific knower because the object of study is also used as her racial marker.

The transcript of her narrative speaks to the struggles Victoria faced as a racialized person living in a web of symbolic representations that do not allow her to disconnect beans from her ascribed identity. Her story challenges the assumption that all students stand on equal leverage when it comes to constructing meaning. In this particular case, Victoria's words illustrate how the ideological constraint of racism, manifested in language practices and supported by the current use of language in her classroom, made her the object of racist practices and constrained her possibilities to become an active knower. Advocates of critical pedagogies recurrently ask us to look at questions of access to knowledge as issues that are not just epistemological, but also social issues. As Peter McLaren (1995) asserts, it is false to assume that "individuals can possess equivalence in the realm of meaning making, that is the realm of epistemology, even when they lack

equivalence in the realm of material resources." (McLaren, 1995). As Victoria's story attested, it is false to presume that all individuals can assume the vantage point of observer, detached from the objects of study, even when they lack equivalence in the realm of social status.

This narrative raised for me an ethical question that lies at the heart of all educational endeavors. What is then the moral obligation we should assume as science teachers, educators, administrators, and researchers confronting the forces of racism that govern relationships in science classrooms?

Drawn once more by the centrality of identities, I bring to the foreground the continuation to Victoria's story so the reader can get a sense of the kinds of responses these girls would like to see from authority figures like teachers and administrators, who can have the power of transforming educational settings:

Victoria: Well, like a Mexican was in my class but nice and cool and everything but /?/ she got all mad and she started getting up in his face and then his black friend started getting up in our face and everybody was up in our faces and then the Mexican boy got up and he said you know man, sit down, they all sat down and I got so mad....But not it's not OK he can start like that when /?/ I was mad. I mean I have /?/ stuff like that with another teacher before and she just kept telling: " No it's not okay talking back," but she didn't write me off cause she was: "Hey, that's not nice, hey!"

[...]

Alejandra: If I were you, I would have been like, you better take your, excuse me, I would have been like you better take your...

Victoria: He wasn't skinny..

Alejandra: ...little butt down to the office with me, cause we're gonna...cause I know Mr. Ramirez would say something to him. He wouldn't let him be like that. Cause I know, Mr. Ramirez, he's like friends with my families and everything...and you know, he's real into, you know, culture, he likes people getting into their culture, and you know, I'm sure he would consider it as much an insult to him as it was to you. So you should have done that.

Victoria: But I was so mad.

Alejandra: Instead of getting all hyperactive and /?/.

Victoria: I was just so mad I didn't know what to. I felt like popping him.

Constanza: Can you walk out and go to the office right away, without any further explanation?

Victoria: No, she'll go down the hallway running after me, and then she'll go...: "Oh, it's all right. Come back." And then she'll like leave all the kids in the class, and they'll get on the telephone calling all over the place hanging up and like, so, I just went to the, I just like went back to my seat, and I started kicking the boy in front of me I was so mad. He was, "Hey, I didn't do nothing to you." I'm like, "Be quiet. You get hair all over my desk."

Alejandra: You have your *piojos* on my desk and they're on my desk they're rolling down my folder.

/?/: And they're Mexican.

[Laughter]

[Conversation-9.24.93]

Confrontations described by Victoria are all too common and they tend to place Mexican students in positions of marginality in relation to their possibilities to construct scientific knowledge. Narratives like the ones that Victoria shared with our group remind us of a relevant distinction between Victoria's location as knower and other non-Mexican students' locations in relation to objects of study. In the portrait that follows we will continue hearing in Victoria's passionate young voice, a clarion call for an informed commitment to pedagogies that transform unequal leverage, pedagogies that demand from us to take an overt political stance in our practice as science teachers and educators.

VICTORIA: PORTRAIT SIX

"Science just can't always be for men."

I just have a lot of opinions about different things and I am like my own person. I don't try to be anybody else. I just try to be myself the best I can and I think that when I'm just myself it helps me get along with other people...I don't want to be somebody else I'm just trying to be myself and act my own way.

[Victoria-Interview-8.24.93]

As fast as could be, Victoria, a twelve-year old vivacious "young lady" with *piel canela*/cinnamon skin, brown hair, and bright dark eyes talked about herself with a strong sense of confidence. The oldest daughter in a family of two children, Victoria was not a recent immigrant to the United States. Some of her ancestors came all the way from Mexico two generations ago, and both of her parents were born in U.S. territory.

I like to be called Hispanic. Mexican's O.K. but when I say Mexic.. Mexx.. from Mexico I'm not actually from Mexico I just like to be called Hispanic. I don't know why. I just think it's a proper word that we should use. I feel like I'm a Mexican but not...I don't know. I just don't like the way it sounds. I just like Hispanic I think it's more intelligent and more grown up...I am not actually from Mexico, I am from America, I am from the United States and actually I am pretty proud of it.

[Victoria-Interview-8.24.93]

Victoria viewed her parents as hardworking individuals highly committed to her education. Both of them finished high school and her father, who "manufactures cars," pursued college work. Her mother, a secretary at a local public school, asserted her position provided access to a wide range of information about enrichment programs available to Victoria.

School was a place where Victoria had learned to succeed. With a 3.888 G.P.A., her name on the honor roll, and a string of unsolicited praise from teachers, she walked proudly down the hallways of Phillips Middle School¹ where she was beginning seventh grade, exchanging smiles and greeting faculty and students alike.

¹ In 1994 Phillips Middle School reported a total population of 1042 students: American Indian 2%, Black 29%, Asian 6%, Hispanic 14%, White 49%; a male/female ratio among Hispanics of 68/83. The percentage of students with satisfactory scores on the MEAP test in 1993-1994 was: math 25.0%, and science 41.8%. The percentage of students whose financial resources made them eligible for free and reduced lunch was 64.5%.

"I want to be somebody. I want to be recognized. Really be on the top. I want to have a good education. I know I'm smart," Victoria said about herself in one-on-one interviews and conversations. Interestingly, she never asserted her intellectual abilities in front of the other girls in our conversation group:

See, when I went to school I knew that I was smart and I know I'm smart but the thing about it is when I get a lot of friends the real smart kids they always like to brag about it and be real stingy about it so that's one thing I don't want to do. I know I'm smart but I don't like to be stingy and that's why I have so many friends.

[Victoria-Interview-8.24.93]

Victoria's awareness of her intellectual capacity was reinforced at home. Victoria's mother spoke of her daughter's potential and success at school as products of her own endeavors rather than the effort or dedication of a particular teacher or the influence of a school setting::

It's what she did...she did fine herself. Before she got into school, I knew she was capable.

[Victoria-Interview-8.24.93]

Victoria reminded me of the industrious squirrels I often see gathering nuts and jumping incessantly from one tree branch to another. She wrote about herself, "I am like a ball I like to bounce back and forth to different things." After an active day at school she would go busily around town getting to an after school science program or volleyball practice, going to family gatherings, or throwing the baton at a parade.

The after school science program was one of the most important connections to science Victoria had experienced. After a year of involvement in the program, she was still actively engaged as a teacher for the younger students. It was through this program that Victoria was first identified as a potential participant for our weekly meetings. She jumped at the invitation promptly because, "I wanted to give you my sayings-opinions," she wrote in her journal.

Victoria's desire to express herself was quite evident from the first time I talked to her. "I just think it's really fun when you interview...I just like to talk...I guess I was just

born with it, " she told me after our first interview. On that day she was accompanied by her mother, who overtly communicated she wanted to know what kinds of questions I would be asking. Her mother's presence did not appear to inhibit Victoria's voice. While her mother assumed the role of attentive listener and complemented some responses with short explanations, descriptions, or corrections, Victoria took the role of respondent, constructing elaborated answers to my questions:

Constanza: Can you talk about the things that make you different than others?

Victoria: Well, many people say I have a New York accent and that sometimes it's hard for me to pronounce different letters in the alphabet and it's just that I like to read out of the books aloud at school and when I say something funny it just makes me feel different. And then something that puts me down sometimes when I can't pronounce the word out of the book correctly.

Victoria's mother: She has trouble with her letter R. I think she just in some way transforms her English, that's all. [Laughs].

[Victoria-Interview-8.24.93]

The strong sense of voice that came across Victoria's descriptions of herself seemed to be undermined by an accent often perceived by her peers as a funny way of talking. Even in our conversation group, after sharing with us the discomfort she felt when people made fun of her accent, Victoria was teased by some of the participants:

Victoria: [It was an] injividual report.

Alejandra: Injividual

Chorus: [Laughter]

Victoria: Injividual

Chorus: [Laughter]

[Conversation Group-11.5.93]

In an apparent effort to disregard the mockery, Victoria would ordinarily go along with the laughter. One day, however, she walked out of our meeting, removing herself from the scene. Interestingly, it was the silence of her absence that brought her confident voice back to the group, as she returned to the room following an apology from Alejandra.

The politics of identity had a vivid meaning in Victoria's experience of becoming a woman of Hispanic origin. As an adolescent, she adopted the name "young lady" to identify both her age and gender:

I like to be called young lady because when you are a girl I think it's when you're younger. When you're wanting to see the world and you start maturing and new things happen to you I think that you should be called a young lady...

[Victoria-Interview-8.24.93]

The meanings Victoria attached to the label Mexican had a whole different tone. As a child in school, she had learned the racial slur used to label kids of Mexican descent:

...because another thing that they say is [intonation shift] /you Mexican kid/ and stuff like that and I just didn't know all that and I'd go on.

[Victoria-Interview-8.24.93]

Hispanic became a language resource Victoria utilized to avoid becoming the target of racism. By claiming the label Hispanic, she positioned herself in a category that did not carry the pejorative dimension children attach to the label Mexican:

...I don't think that if you are a Hispanic and you come from Mexico that they're gonna call you wet back all the time but that is usually the form that they use...I don't know...I wouldn't call nobody that. I wouldn't myself, but kids really..I know it hurts a lot of the Hispanic children and so they end up fighting.

[Victoria-Interview-8.24.93]

At the time I first interviewed Victoria, she held low expectations for her Hispanic peers, an issue she never raised in front of the other participants in our conversation group:

See, there aren't Hispanic students that are really...you know, all the Hispanic students that come to this school don't take things seriously.

However marginal, she did mention the names of a few students among her Hispanic whose company she preferred because they really "took part in things". She also expressed an interest, most likely hope, in finding more Hispanics to participate in the kinds of academic programs she liked to attend.

At this point in her life, Victoria had high expectations for herself, all revolving around a professional career. Her goal was to go to college and become a scientist or to major in English. But in spite of her belief that unique opportunities existed for Hispanics

(her own cousins had just earned scholarships to go to college), Victoria did not underestimate the challenges ahead of her:

...now they're trying to get a lot of the Hispanic children to go to college and everything and that will probably make a little bit sooner but now since there aren't so many Hispanic children going you have to push yourself into make you fit in, you know, push yourself into the crowd and everything...probably it just be a big adjustment I'd have to make.

[Victoria-Interview-9. 2.93]

When she talked about the ways her ethnic identity might shape her future, Victoria depicted a challenging experience of molding herself to fit into the mainstream and "getting along with other races." She seemed to know she would need to change who she was, in order to participate in college life. Victoria shared the belief that the educational institution where she would be attending college would not adapt its structure to the incoming Hispanics. Instead, she assumed, students would be responsible for making all the adjustments to 'push themselves into the crowds.' She also anticipated that Hispanics' presence would be ignored in college unless the number of students increased.

Victoria's accounts about her educational experiences in and out of school were marked by the boundaries of race. As a participant in after school science programs, she highlighted racism again as a form of oppression that shapes her life:

I've got discouraged in my life before because I went to the University Science Program and there was not one Hispanic student there, and I'm saying, "Gosh I just feel left out," because everybody is a different race you know, and then some parents are prejudice and sometimes teach their children to be that way you never know what you can be going into.

[Victoria-Interview-9. 2.93]

Victoria's thoughts on ethnic identity were shaped by her knowledge of racism in schools, her attempts to escape mockery, and a developed awareness of the importance of "fitting in." By contrast, Victoria spoke about her gender identity in a language of positive imagery, highlighting new opportunities and a personal desire to see the world:

Just because I'm a woman, women are trying to get up there now and they have more activities going on for women and that probably give a bit of advantage. Like women had the University science Saturday. We had boys and girls. I think it's

fine that boys just stay with their groups too because I /?/ think you should stay about even.

[Victoria-Interview-9. 2.93]

In her narratives, Victoria did not describe obstacles in her way, when she spoke about her gender identity shaping her future opportunities:

I think that you just take (it) easy and go day by day really work up into what you want to be then I don't think that you should have any problems.

[Victoria-Interview-9. 2.93]

While Victoria brought up the themes of race and overcoming racism as conditions for a successful experience in college, she did not raise the issue of overcoming sexism as a necessary condition for success. Her positive outlook towards a future as a woman contrasts her mother's warning remarks about structural forces like the enactment of traditional gender roles awaiting Victoria. I find this contrast quite interesting, for it gives us glimpses of social change in younger generations. But I also tend to believe that Victoria's remarks raise concerns about her lack of awareness of social constraints that might impede her full development. This was particularly important in her case, because she expressed a dream of becoming a scientist.

As the only participant in the group who envisioned a future in science, Victoria contributed a unique set of narratives that enlighten our understanding of the interplay between science and identities. She seemed to embrace a belief, strongly supported in the U.S., that you can "be all that you can be." I began reading Victoria's narratives with the assumption that she had the intellectual attributes, social background, and personal interest that are necessary to participate successfully in science. Victoria's high self-esteem, clear goals, parental and institutional support, and excellent academic record were all conditions that projected success. Given this set of conditions, I wondered how Victoria was crafting her identity in light of a future career in science.

"My future as a scientist has a positive outlook. I have always wanted to experiment different things," Victoria asserted in her journal. Her journal entry also elaborated on the

kinds of things she liked to do and connected her personal attributes to the opportunities offered in the sciences. As someone who liked to be involved in different kinds of things, Victoria perceived in the different sciences a wealth of opportunities to become an active participant. Against this backdrop, the words of Victoria's mother bounced in my ears: "You can't talk too far ahead because you might turn just being a housewife, like me." [Victoria-Interview-8.24.93].

The words of Victoria's mother surfaced as a reminder of gender expectations that shape girls' futures. Victoria's positive outlook on her future life was already limited by the traditional role of housewife shaping her gender identity. Victoria's life as a housewife appeared as a track that left no opportunities for a professional life. The tension between becoming a housewife and pursuing a professional career was already present in Victoria's life, even when she was just at the stage of dreaming.

The simplistic either/or scenario of housewife vs. scientist, was complicated as Victoria's mother elaborated a more complex alternative: "If she wants to become a wife, that's fine. She can be something else at the same time. You're gonna have to do all them parts when you grow up to be a bigger lady." In her second narrative, Victoria was depicted by her mother again as a wife, only this time she would be juggling multiple chores simultaneously. As a grown up "lady," Victoria had two options, one was to "just" be a housewife, and the other "to do all them parts." Either way, Victoria's gender served as an identity marker that limited her plans to become a scientist. Being a "lady," her future life looked at worse fatalistic, if she had to give up a dream, or, at best very difficult, if she had to juggle "all them parts."

Interestingly, Victoria did not take her mother's words as an inevitable reading of her future. Rather, she responded to her mother's warning by rejecting the assumption that she would juggle home chores, kids, and work: "I don't want to be stuck in my house with a bunch of kids." In Victoria's outlook, there was no point of juncture between assuming traditional women's roles and becoming a scientist. To become a scientist, instead she

abandoned the narratives of gender identity constructed by her mother. This challenge of abandoning traditional images of gender roles was a quality Victoria extended to other women who participate in science.

Constanza: Some people say that science is male defined, what do you think they mean by this?

Victoria: ...men probably did invent science in the history but now that they need to see that women aren't afraid to stay in the house no more and just that women are now getting into science so, I would say it was defined by men back then it would be okay, but now I don't agree with that. I agree that women can define it too....women now are trying to define it we're just in the process of doing it. I don't think that's completely done yet. It's not done at all, it's just in the middle.

[Victoria-Interview-9. 2.93]

At the time we talked, Victoria saw a place for women in science. She also saw science as a future opportunity, where there was a place for herself. However, in her narratives, participation of women in science clearly entailed a transformation of gender expectations whereby the gender role of housewife was no longer assigned to women. Change was a necessary condition, in Victoria's narratives, to grant opportunities for women to engage in the "project" of science. But the burden of change in Victoria's narratives laid heavily on the shoulders of women:

..like my mom said it takes one person to start it you know? So if one woman tries to change it then a lot of the other women will get up and say: "Hey, we can do this too" and so they'll start changing and changing....They just didn't think that they had enough power to overpower men, because men have so much power, you know and so they probably thought that they just weren't good enough, but one person must have got up and said: "Hey, we are good enough."

[Victoria-Interview-9. 2.93]

Victoria was aware that her gender placed her in a disadvantaged position compared to people of the opposite sex. As a potential scientist, she already envisioned a good number of obstacles attached to her gender identity. Her expectation was to overcome these obstacles individually by challenging traditional roles and low social expectations about women. In spite of her awareness of power structures that benefit men, Victoria still

believed in individual qualities like courage and self-esteem, as sufficient attributes to promote change.

Given a place in science, I wondered what contributions Victoria was expecting to make to this enterprise. During interviews, Victoria reasserted her belief that women were participating in science, specifically space science. Her narratives about women's contributions, revealed her understanding of gender as a form of identity that shapes scientific knowledge:

..if a man always sees one part of this and then a lady goes back up there [in space] and looks it all over again, the lady will see the other that the man missed. So the lady and the man probably not actually all different ideas, but new ones that the man probably didn't see or didn't observe... The men probably go there to observe the planet or whatever. The lady probably goes up there for the description of the planet because they're more feminine and they probably go up there seeing which shape is...and not that they'd always do that but they'd probably do it more than men do.

[Victoria-Interview-9. 2.93]

Victoria depicted men and women as contributors whose observations complement each other: "The lady will see the other that the man missed." Interestingly, she did not place women scientists in a position of contradicting or opposing men's views, "not actually different ideas," but rather completing a picture that men missed. This complementary view of gender is reminiscent of the ways genetics explains sexual reproduction, where each parent contributes half the number of chromosomes to make complete one individual.

Victoria's epistemological assumptions shared common threads with standpoint theories (Harding, 1986, 1991; Harstock, 1983). Not unlike standpoint epistemologies, Victoria constructed a picture of science that would be incomplete without women. In her narrative, she described the knowledge women would contribute to science as a set of observations connected to their gender identity. It would be interesting to trace the origins of this epistemological position to better understand Victoria's motivation to engage in science. As a confident knower, and a member of a social group, Victoria placed herself in a position of contributor. Her gender identity made an important difference in completing a

picture of science, which she viewed as "an everlasting project that has no ending" [Victoria-Journal Entry-Undated].

In addition to the themes of gender roles and gendered ways of knowing, the themes of "getting out" of the house, not being "afraid," and believing "we are good enough" all placed Victoria's experiences against a masculine normative standard:

..the majority of women probably like to get out and show men that they can do it now, and not only that the men can do it and that they're big men all the time. That women also have the chance to do it. ...women know that they can do it they probably want to get above man. Not let man always rule the world instead of what women do now. And probably at home now are probably doing science everyday too. But the women who really have a career in science like if you're an engineer or something they're not afraid to do it and men should understand that.

[Victoria-Interview-9. 2.93]

Supporting the woman scientist, there was a strong will in Victoria's narratives to overcome men's power. As a future scientist, she envisioned a woman contributing a missing piece to knowledge of science, overcoming fear, changing traditional social roles, and overturning men's power, all of which laid in the hands of intrepid women. Victoria, the only participant in this dissertation study who envisioned a career in science, found a place for women in this field at the cost of going against the grain of traditional women roles.

Victoria's stories spoke about the numerous challenges facing a Mexican girl who wanted to become a scientist. Victoria's agenda of constructing identities against the grain of dominant ideologies that contribute to shape marginal identities in science was a recurrent theme in our conversation sessions. In the next chapter, I will continue examining the agenda of constructing inclusive identities in the science classroom, through narratives which once again call on us science teachers, educators, school administrators, counselors, and parents to become involved in this struggle.

Chapter 7

SCIENCE, A SPACE FOR POLITICAL ACTION

In the last portrait, I introduced Victoria, the only girl in our conversation group who envisioned a career as a scientist. As a person who saw herself participating in science, it is particularly interesting to read in her narratives a continuous theme of struggle in the context of science classrooms. In the sketches of her portrait I brought in narratives where Victoria alluded to the challenge of shaping oppositional identities that went against the grain of societal norms and cultural values. Most importantly, Victoria constructed stories that at once acknowledged and attempted to escape the forces of racism and sexism in her life. In her narratives, Victoria repeatedly composed an image of a Mexican girl contesting boys' power, defeating stereotypes of women and Mexican people, and overcoming fear. These themes, as the reader will see in this chapter, were not unique to Victoria's experiences at school.

In this chapter I continue exploring and analyzing the themes that Victoria highlighted in her narratives. I begin by walking into Victoria's science classroom, leading the reader towards an appreciation of the conflicts underlying a seemingly congenial setting where all students appeared to be "learning"¹ science. I then turn to our conversation group, where I shared my observations in Victoria's classroom and asked Victoria to construct a narrative of what I had seen. My brief incursion into Victoria's classroom became a much richer experience after I listened to Victoria's elaborate story based on my observations. It was also enriched by information drawn from her previous narratives of experience. I also incorporated into my reading of what happened in Victoria's science classroom the information I gathered from interviews and conversations with other girls. This rich set of data allowed me to listen to themes that are often invisible to the occasional observer and connect the theme of peer conflict surfacing in Victoria's narratives to my

¹ Quotations are used here to call the reader's attention to the misuse of the word "learning" as a representation of an observer's perceptions of students' actions.

observations of a high school setting, where Dominic experienced similar conflicts, and also to Alejandra's narratives about similar experiences of conflict in high school. This set of narratives reveal the political agenda of shaping identities, as part of the curricular experience of girls of Mexican origin.

"Beat him up." Another Science Curriculum

The scene was very familiar. Another classroom in an old urban public school building, framed within four walls. A blackboard, lateral windows, a teacher's desk, and rows of chairs lined up facing the front. I have seen similar settings in so many other middle schools, but yet, this one was different. I approached it with a sense of familiarity that allowed me to see the unique qualities of a common setting. Victoria and her stories have given me this sense of *déjà vu*.

I entered this seventh grade class as an observer and sat in the back of the room. From my angle, I could see the backs of twenty-five heads, apparently attending to their "encyclopedia activity," which consisted of selecting an endangered species from a book and writing a report about it. Victoria seemed to be engaged in her work. After she picked up a book from the cart that Ms. Taylor had placed in the front of the room, she got a piece of paper, returned to her seat and began to write.

The course of the lesson proceeded calmly. Ms. Taylor had communicated the message that this was quiet time. However, several students interacted with other classmates quite frequently. Victoria, for instance, would often turn her head towards her neighbor and talk to him. From the distance, it appeared as if they were both working on the same assignment.

[Fieldnotes-11.9.93]

In our weekly conversations, Victoria's stories about science class occasionally took us through experiments and activities, but seldom allowed us to explore the science content she learned. When Victoria talked about science class and her experiences in school, she often brought to life physical and verbal encounters with boys who teased, poked, or called her racial names. The emotional character of her voice and the recurrent thematic pattern in these stories made them intense and disturbing.

The harmonious scene of Victoria's science classroom described above did not coincide with her narratives about life in school in our conversations. My double role as listener in our conversations and observer in the classroom brought to the surface the discrepancies between the scenario I had once heard about in our conversations and the one I saw when I visited Victoria's classroom. To better understand this contrast, I brought my observations to our conversation group and asked Victoria to comment. I was especially

interested in getting Victoria's perspective on what happened on the day I had been observing; in particular, I wanted to know more about the content of the conversation with the boy sitting next to her.

Constanza: So, Victoria was doing some report on endangered species and you were talking to a guy sitting next to you.

[Laughter].

Constanza: I was wondering, what were you talking about?

Dominic: Uhhmmha Victoria?

Victoria: The one next to me or the one behind me.

Constanza: The one next to you.

Victoria: Keith?

Constanza: I guess, I don't know.

Victoria: Uhhh was he short, Black? Yeah Keith. That was the boy that he was calling us racial names and so and he they had made him...

Alejandra: Beat him up!

Victoria: They had made him apologize to me because I had this guy really mad at him and it was growing out of proportion, it was a couple of weeks before that and so we had they had took us to the principal and we had to talk to the principal and so they had made him apologize to us for calling us racial names and so, now he was trying to be all nice to me. That's why I was talking to him.

Constanza: So this is the guy you had the principal talk to. That makes sense. He looked quite nice to you, right?

Dominic: What did you say to him.

Victoria: Uhhh. If you would have been there yesterday we had a substitute, you would have sawed how really bad he was. We had Ms. Summers yesterday and Uhm...

Constanza: And what was he doing with the sub that I didn't see.

Victoria: He was throwing/staples?/at everybody.

[Laughter]

Victoria: He was throwing spit balls at everybody.

[Conversation-11.12.93]

When I asked Victoria to talk about science class, she chose to narrate a story about conflict between her and the "short," "Black," "boy" that called her and others racial names. This person also happened to be her assigned partner for the day's activity in science class. I wondered what her story was about. What did it have to do with endangered species? Victoria did not talk about the content of what she had learned that day. Instead she focused on other issues that seemed to matter to her.

After a first reading, Victoria's story might appear as a diversion from the science curriculum, if we understand curriculum simply as a body of knowledge, activities, and discourses pertaining to science. However, Victoria's focus on interactions and relationships, as opposed to disciplinary content, seemed relevant to me because her theme was not unusual among our conversational partners and it evoked power relations embedded within her classroom which disrupted opportunities to learn science and communicate what she knew about science. I tracked down the beginning of Victoria's story about Keith two weeks earlier, when she elaborated on her relationship with a classmate who did not respect her. On this occasion, Victoria's narratives came up in response to the girls' theme of respect as a condition for healthy relationships between boys and girls. I picked up the theme of respect as a focus of our conversation: "Victoria said she wants to be respected for who she is, let's go around and see what each person wants to be respected for.:"

Victoria: Like, my mom told me that if a boy don't respect you, you don't have to respect him, and, like today in technology, that one boy was trying to call me a bunch of names and everything...[he was the one who called me brown burritos and Mexican dust] and, and I, I hit him so hard, on his shoulder, if I would have hit him on his face, he would have squished me in a minute. Cause he was big, and, cause I was like, I hit him so hard, on his shoulder, and he like got really mad, and I said, I don't care if you get mad, because I'm not scared of you and if you want to do something, come on, and he like, well, I don't have time to mess, /?/on you cause you /?/and I said, "well, you're just Black, and you're not nobody special either," and ... cause, I had, we had...

Alejandra: Go girl. Go girl.

Victoria:we had made these vehicles, and we had to race them, and his only went to 11 feet, mine had gone to 12 1/2 feet, and he, got all mad and goes, "man, how can this Mexican beat me." And I go well, I'm glad this Black didn't beat me, you know, I'm like, getting really mad at him, because he was over there being racial, and...all the Mexican kids that are in the class, like, they, the only one that./?/

[Laughter..]

Victoria:and, so that's what I said, because there's a boy, he thinks that he can just talk to all of us Mexicans in the class because half of them won't even do anything, and I don't know why.

[Conversation-10. 8.93]

Victoria's response to the derogatory representation of Mexicans revealed a contradictory stance towards group affiliation, given that she had expressed a conscious decision to set herself apart from her Mexican classmates. Interestingly, Victoria had asserted on an interview that she did not prefer the identity of Mexican over that of Hispanic, for it made her a target of racial slur. However, Victoria could not escape the racial narratives constructed by her classmate and she took it upon herself to stand up and resist racial slur directed towards Mexicans. Victoria's narratives revealed her recognition of group membership and loyalty towards Mexicans, while she expressed discontent when she learned that all Mexicans do not confront racism in the same way.

Victoria's encounter with Keith was brought up again, a week later, to our conversation group when she elaborated on the verbal exchanges between them:

Victoria: And then this other boy whose name is Keith and he's in my uhmm technology class ands that was the same boy who I, we were fighting each other cause he was the one who called me brown burritos and Mexican dust.

/?: Uhhhh I hate it when they do that

Victoria: I got so mad I had got all up in his face he is all chubby and everything he's like: "I know you don't want me to sit on you." "No, I don't want you to sit on me either." He says, "I'll do that." I go, "No, cause I know you'll try to do something else."

Alejandra: You know what you should have said?

- Victoria: Excuse me, so we had to make these little vehicles and I was racing him and mine head off speeding frrmmm and it had bit his, and then he got all mad "Man you won't /??" "well I'm sorry home boy I said /?/"
- Marisa: Mexican is better [laughter]
- Alejandra: Brown is better. Forget blue.
- Victoria: I don't need the fat to scratch you. And I had just turned around and left cause he would have tried to make all my friends /?/ Excuse me cause they won't speak up to themselves I go to him like "I know you're just won't say that to me because you know I ain't gonna take your stuff. He goes "Yeah, you will cause I got this [showing fists]. I'm like, "Oh I've got this" [showing her fists]. He goes, "I don't have time to be wasting on you." I go, "Good cause my clock is running out of time too. "It just gets me really mad.

[Conversation-10.15.93]

I read Victoria's narratives as stories of personal courage, for she described a situation where she contested a big boys' position of power: "I don't care if you get mad, because I'm not scared of you," she said in her first story. In her narratives, Victoria described her classmate by his gender and his size, both characteristics that placed him in a position of power: "Cause he was big;" "this other boy whose name..." By way of contrast, she marked this boy with racial characteristics which made both him and herself vulnerable: "you're just Black, and you're not nobody special either," "I'm like, getting really mad at him, because he was over there being racial."

Victoria's was also a story about challenging stereotypical images of Mexicans, as people who are not winners, as suggested in her classmates' alleged remark: "Man, how can this Mexican beat me." But in spite of her courage, Victoria's narratives are quite problematic for they reveal the ways girls perpetuate racism even when they intend to challenge racist ideologies that inform their relationships with their classmates. This is evident in Victoria's description of her competitor as someone who, by virtue of being Black, "is not special either."

Throughout our talk, the themes of challenging images of gender and race seemed to characterize a dimension of these girls' curriculum. Both challenges required a certain

quality of courage that these girls enacted on a daily basis as part of the regular curriculum in the science classroom. But girls' strategies to challenge demeaning self-images of racialized and gendered individuals were also strategies that made them marginal to science, not only because they drove their attention towards peer conflict rather than the content of the science lesson, but also because the consequences of "beating up" a classmate often generated disciplinary actions that led to physical withdrawal from the classroom.

In the following section I focus on my observations in Dominic's science class, where again, the theme of peer conflict surfaced. On this occasion, however, conflict was not subtly played under the table, as I had observed in Victoria's classroom. In Dominic's classroom conflict erupted into a serious situation where the students involved had been taken out of the classroom and were heavily reprimanded by their teacher.

To Hit or not to Hit: Is that A Curricular Question?

A hallway in Dominic's high school was another scenario where one experiences the kind of courage girls need when they attend school.² In addition to recurrent practices of touching, pushing, jerking, there was tremendous commotion between classes and the force of a human ocean that seemed overwhelming. I usually tried to enter the school before or after the bell signaled the change of classrooms, for I soon found my skills and body size to be quite inadequate attributes to swim against the waves of students moving to their classes between hours. When I visited Dominic's school, the seventh hour had just begun:

The hallway leading to Dominic's classroom was clear. The bell just rang and the crowd that had just stampeded down the hallway disappeared behind the doors, taking with them the noise and commotion. The comforting silence invading the

² This observation is not unique to Dominic's school. I experienced the same situation in every other middle and high school I have visited in Cedarville. The pervasiveness of sexual harassment in school hallways is quite troublesome. According to the AAUW report, *Hostile Hallways* (1993), while boys experience unwanted sexual behavior, girls are far more likely to have been harassed repeatedly and at younger ages. Minority girls are especially likely to be targets, with 42 percent of African-Americans and 40 percent of Hispanics reporting sexual harassment by grade six or earlier as compared with 31 percent of white girls. Girls are also far more likely than boys to report feeling embarrassed and upset, self-conscious and scared as a result of the experience. 33 percent of girls and 12 percent of boys were so troubled after being harassed sexually they did not want to talk in class or even go to school.

hallway was suddenly disrupted by far away voices. I could hear a female adult: "When you're ready to come in without hitting each other, you can come in. Yesterday Mrs. Hazelwood was here, do you need her to be here everyday for you to behave?" At this point I was very close to Dominic's classroom, the place where this encounter was taking place.

Dominic spotted me and waved her hand discretely: "Espérate,"³ she said. She stood against the wall facing her science teacher, Ms. Gibson. By her side there was a boy whose gaze was fixed to the ground for a couple of minutes. Both students stood quietly with their heads bowed until their science teacher finished her last statement. Then they walked into the classroom and proceeded with their assignment.

[Fieldnotes-11.9.93]

Like Victoria, Dominic had been facing a recurrent conflict with the boy seated next to her and her teacher had pulled her out of the classroom in an apparent effort to stop the behavior. After I observed the above incident I had a long conversation with Dominic. Later that same week I brought to our conversation group my observations and described Dominic's classroom to get her insights on the ways I was portraying her experience.

Constanza: So I saw Dominic, let me tell you a little bit about what I saw.

Dominic: Was I good?

Constanza: Uhm... did you have to ask that? [Laughter]. Dominic sits in the very front row of her class

Lupita: Is that her choice?

[Laughter]

Constanza: And she sits next to a guy.

/?/: [Uhm?]

Dominic: Oh you guys, he's all pimply.

[Laughter]

Constanza: But he is always kind of harassing you, I would say, poking you?

Dominic: His arms are all scratched up from me.

Victoria: You scratched his arms all over?

Dominic: But I didn't scratch him when you were there.

³ Espérate is the command form of the verb esperar which means to wait.

- Constanza: But you wanted to, right?
- Dominic: Uhmmm-ha.
- Constanza: So Dominic was also acting differently because I was there.
- Dominic: I was hitting under the table so you couldn't see.
- Alejandra: But then she goes and tells her, she's like: "Oh, by the way I was abusing him."
- Dominic: I wasn't just sitting and let him beat on me all this time.
- Constanza: But that's what your teacher would like you to do right?
- /?/: She must be crazy.
- Dominic: I'm not gonna sit there and let a boy hit on me.
- Constanza: Is that what she wants you to do?
- Dominic: No, she wants me to ignore him and for him to leave me alone.
- [Many voices overlapping]
- Dominic: ...Cause he won't, he won't.
- Constanza: OK there's one thing that really bothers me about your situation. That a guy can control the way you are learning or your opportunities to learn?
- Dominic: He can't control me, I just can't sit there and not let him get on my nerves cause it makes me mad. I mean somebody's always messing with you: "What's the answer, give me the answer and he hits you" you don't just sit there and be like..

Contrary to my observation that Dominic was being "harassed" and controlled by the boy seating next to her, Dominic presented herself in front of other girls in our conversation group as an active participant in the process of shaping her gender identity in the science classroom. She constructed an image of an assertive, if not aggressive girl, who scratched the boy's arms. I read Dominic's narratives as a challenge of stereotypical views of females, one which she summarized in her teacher's messages: "to ignore him and for him to leave me alone." Dominique contested the message that she needed to ignore, in a passive "feminine" way any physical aggression directed towards her. She resisted to wait passively, while her male classmate stopped his behavior. In her assertion, "I'm not gonna

sit there and let a boy hit on me," I heard a rejection of the image of a "well behaved" girl who learns to roll with the punches. I found this way of portraying herself quite interesting, for it marked a sharp contrast with the more "victimized" girl I had encountered on the day of my first visit to Dominic's classroom. After this visit I had a conversation with Dominic and she asserted that her male classmate was constantly invading her physical space and demanding that she gave him the answers on tests.

Listening to Dominic's narratives I heard a most interesting perspective on "hitting" which was further elaborated when I raised the issue of gaining control over her right to learn:

Dominic: He can't control me, I just can't sit there and not let him get on my nerves cause it makes me mad. I mean somebody always messing with you: "What's the answer, give me the answer," and he hits you. You don't just sit there and be like...

Constanza: But isn't that controlling you? Don't you think that's controlling your life if all the time you have to be responding to him?

Dominique problematized the issue of "hitting" in ways I had not anticipated. She reminded me how hitting back is considered an act of courage among adolescent girls who attempt to gain control over their rights. In her view, the boy sitting next to her in science class was not in control of her opportunities to learn and participate in science as long as Dominic had the courage to face him and stop his aggressions by hitting back. If we see Dominic's actions as a way of asserting herself, rather than just a disciplinary disruption, we begin to see in hitting a form of resistance, a way of breaking a pattern of power relations where the girl is given power, as opposed to being victimized.

Narratives about "hitting" and "beating boys up," raised for me set of interesting, perhaps even contradictory positions. The different narratives constructed by Dominic in the presence of other girls became problematic when Dominic admitted: "But I didn't scratch him when you were there." Interestingly, my presence in Dominic's classroom altered her resistant behavior to match an image of a "good girl" she purposely displayed while I was in her classroom. On the other hand, Dominic constructed different narratives

in our group conversations where she overtly elaborated on her "hitting" behavior. This difference between the narratives Dominic was constructing in our conversation group and the narrative she constructed for me while I was viewed as part of the school setting, raised the issue of authenticity. For a while, I was intrigued by the truthfulness of Dominic's narratives, but I soon abandoned this quest, reminding myself that the relevance of Dominic's narratives did not rest upon their ability to mirror events that happened in the classroom. Rather, Dominic's narratives could enlighten my understanding of "hitting" in the context of these girls' lives in schools. The narratives about school science constructed by Dominic and Victoria in front of other girls in our conversation group struck me as representations of girls who intended to be active contestants, rather than passive receptors and reproducers of social inequalities. Regardless of the proximity of these narratives to the actual accounts of events that happened in the classroom, these girls' stories talked about their active roles as shapers of identities embedded within a social system impacted by the structural forces of racism and sexism.

By taking a closer look at hitting as a form of resistance, I faced the perplexing contradictions inherent in its practice. "Beating," "scratching," and "hitting" were the strategies that girls, as human agents, used to resist oppression. However, these practices reasserted the girls' position of marginality in school settings where they were not expected to engage in the kind of behavior displayed by Victoria or Dominic. Hitting triggered immediate responses on the part of school authorities conducive to punitive measures. People who hit, and those who received the punches were caught in a very problematic situation. So were the teachers in need to resolve physical conflict in order to proceed with a lesson. In the context of these girls' schools, conflict across racial and gender boundaries was "resolved" by authority figures by focusing on individual behavior and attempting to stop it. This measure, however, did not change the relationship that started the conflict. More than a possibility for change in power relations, in the world of schools "hitting" was a behavior to be corrected.

One would think that our conversation group was a context where we were allowed to explore multiple possibilities to handle a situation like the one Dominic was experiencing. In our talk, we came up with the following options:

Alejandra: Why don't you have him send him down to the office or something.

Constanza: You can talk to your teacher.

Dominic: She's /?/

Marisa: I think the teacher should move one of them, something like that I don't know.

Constanza: And what about that, have you talked about that?

Dominic: Uhm-ha, I /?/ move Roy and she said that [sigh] This week has been going pretty good but if he starts messing around like he was doing today and yesterday, then she's gonna move him.

Constanza: And if she moves him do you think that that's gonna make you participate more?

Dominic: Uhm-ha.

Interestingly, in our conversation we all sought for authority figures who would intervene in the type of conflict that Dominic was facing. Alejandra suggested talking to the principal, while Marisa and I alluded to the teacher's role. The strategies of sending someone to the office suggested by Alejandra, a high school student, or switching chairs, suggested by Marisa, a middle school student, were common occurrences in schools. Incidentally, Alejandra had told us in a previous conversation that the kind of conflict that Dominic was facing did not recede when you move up to high school and she gave us an example of the ways she handled similar situations of conflict:

Alejandra: That's why I liked the idea of going to high school better than staying in middle school. It's because at high school you know people are supposed to be more mature and everything and I still kind of think it's just the same thing I mean it's just the same. I just wish people would grow up and quit saying things to provoke other people.

Victoria: Yeah Margarita [dubious tone].

Alejandra: I'm serious I mean cause all right, I had forgotten about this but /.../ it was Wednesday, this Mexican guy that was in my second hour he went and called me a bitch and everything for no reason cause he

was trying to hmmm impress his friends you know, he wouldn't say that...

Victoria: Did he like you?

Alejandra: He used to be someone that I knew you know and he was trying to act like he was real everything in front of his friends and then you know at first I didn't /think?/ he was talking to me 'cause I was doing my work and I don't expect people to say that to me and the kid behind me goes, "Who." He goes, "That girl over there." and he goes, "Yeah." And then I turned around cause there was a kid right behind me, I turned around and I was like, "Who me?" He was like, "You bitch and everything like that and then the teacher was all like the teacher made them move to the other side of the classroom and we were still arguing and he was like, "How come you didn't move that ugly girl over there" and everything and I was like, "What?" I was, "How come you're saying all that over there, how come you're not over here in my face saying that to me." And he was like, "Well look at you sitting down" you know.

Victoria: Did you stand up?

Alejandra: Yeah, I stood up and I went over there. I went over there and I was like, "Excuse me what did you say?" And he was like, he was like, I wasn't about to hit him first but he was like, he was like, "You better not touch you know better than to touch me. No, he said don't touch me. "Like that. And I was like, "How are you gonna say that to me now after you already called me a bitch after /?/ and called me ugly after you all trying to act like you're everything in front of your friends and then you're gonna tell me not to touch you. "I was like." I touch if I want to and see what I do next time you call me that name. "And the teacher she was all like, "Sit down," you know and I went and sat down cause I wasn't about to get in trouble. And then hmmm she sent him out of the classroom down to Mr. Vargas.

Victoria: Oh, I like this guy [Getting ready to tell her story].

Alejandra: She sent him down to Mr. Vargas and you know, she sent him back down there today cause she wanted to know, and so Mr. Vargas called me down there and he asked my side of the story and it made me mad because this guy he gave him a completely different story. He said that him and his friends were just talking and everything and then I turned around with an attitude and that I was trying to be all mean to him and that I started it and I called him names and everything.

Victoria: Mr. Vargas didn't believe him, did he?

Alejandra: No, I just looked at him and I didn't even say anything I just wanted to reach over and just kill him for lying so bad.

Victoria: You know that one boy I was telling you about.

Alejandra: Wait just a sec, just a second, just listen.

Victoria: My fault, my fault.

Alejandra: And then Mr. Vargas was like, Mr. Vargas seen me get mad cause I was just looking at him and I wasn't even doing anything, I was just looking at him and he was like, "What happened?" And I told him you know what I said to you guys and he was like, you know the first time when I told him the first time the name he called me he as like he looked at everyone he was like, "You say sorry to her right now." He said, "I don't appreciate a young man calling a young lady a bitch" he was like "that's not even right," he was like "that's not her name and for you to disrespect your own culture, to disrespect people your own race and everything," he was like "that's so wrong," he was like "you shouldn't even be fighting among yourselves" and he was like "I don't appreciate you saying that" and he was like "I better not ever hear you say that to her again" and he made him apologize to me and so I was glad that I didn't hit him.

Victoria: Give me some more hand sister.

Alejandra: What I was gonna say was that before the teacher moved him the reason the teacher moved him was because I was like excuse, my teacher's name is Mrs. García and she's Mexican too and I was like, I was like, "but that boy over there doesn't need to be using that profanity towards me." I was like, "he doesn't need to talk to me like that." And she got mad and that's why she moved him to begin with cause she didn't hear him, cause she was talking with one of the students and they were having problems with something and that's why she moved him and I don't know it just seems that is cause I know I don't start stuff because every time I get into something like that I never get in trouble cause I just don't start it.

Alejandra: I'm sorry but in the dictionary a bitch is a female dog and I don't walk on all fours, that's not anything my parents gave so why does he need to talk to me.

Constanza: Why is that a bad word.

Alejandra: Because when they say that they just don't mean the definition they mean it as an insult they mean it to make you feel dumb, to make you look as less of a person that they have a right to call you something other than your name, and that's why I find it really offensive.

Alejandra's narratives explored alternative strategies to hitting which told us about the possibility of finding authority support in teachers and administrators who expressed alliance towards Mexican people. In her story, she highlighted the ethnic/racial identity of a group of characters involved in social conflict. The student using "profane" language towards her was as Mexican: "...Mexican guy that was in my second hour he went and

called me a bitch and everything for no reason cause he was trying to hmmm impress his friends you know..." Alejandra also described her teacher as Mexican: "... my teacher's name is Mrs. García and she's Mexican too and I was like, I was like, 'but that boy over there doesn't need to be using that profanity towards me.' I was like, 'he doesn't need to talk to me like that.' And she got mad..." A second authority figure, Mr. Vargas, was described as someone who called on ethnic/racial identity to emphasize the need for solidarity and respect among people belonging to the same culture and the same racial origin: "that's not her name and for you to disrespect your own culture, to disrespect people your own race and everything, "... "that's so wrong," ... "you shouldn't even be fighting among yourselves." Alejandra's narratives make me wonder to what extent race and ethnicity accounted for Alejandra's story having a satisfactory outcome: "And he made him apologize to me and so I was glad that I didn't hit him." They also raise the issue that authority figures play an important role in re-asserting girls' position of resistance against oppressive language.

Seeing authority figures as allies in the struggle against oppressive forces marks a major contrast between Dominic's and Alejandra's experiences. Dominic did not seem to have the same level of trust in school authorities as Alejandra did in her school assistant principal, and she did not weave into her narrative the alternative of getting help from her teacher either. On the other hand, she did consider the option of changing seat arrangements, one suggested by Marisa in our conversation group. This acknowledgment of the alternative of changing seats was followed by Dominic's wishful comment that Roy might just stop his behavior: "This week has been going pretty good but if he starts messing around like he was doing today and yesterday, then she's gonna move him."

Embedded in sexist and racist ideologies, these girls' stories share a common theme of resistance to identities that disempowered them. Victoria's narratives talked about shaping a Hispanic girl's identity in opposition to a black boy: "Because there's a boy, he thinks that he can just talk to all of us Mexicans in the class because half of them won't

even do anything, and I don't know why." Her narratives revealed the ideological structures of sexism and racism by which she continues to create partnerships in science. Examples of such revelations were represented in statements like: "Well, you're just Black, and you're not nobody special either," which is an expression of racist ideologies or "But he's a boy, you know and so he'll say: "Well you help me I already did that part," which spoke to the sexist expectation that Victoria would do most of the work, while Keith would get the credit. Dominic's narratives talked about the struggle of shaping a girl's identity against sexist forces: "I'm not gonna sit there and let a boy hit on me." In their attempts to oppose a condition of subordination these girls brought up conflict that consequently placed them in marginal positions in regards to science, sometimes even in the hallways, outside the physical boundaries of the science classroom, where I found Dominic. Alejandra's stories spoke about the ways she constructed meaning when she was a target of sexist, profane language directed against her: "...they mean it as an insult they mean it to make you feel dumb, to make you look as less of a person that they have a right to call you something other than your name, and that's why I find it really offensive."

The narratives I have brought to this section raise a number of relevant issues. First, they show how the enactment of agendas of most importance to psycho-social development, like identity formation, make girls of Mexican origin particularly vulnerable in classroom settings. Second, these narratives revealed the girls' agenda of changing power relations in their classrooms. Because girls of Mexican origin can not escape dominant identity politics that operates upon them on a daily and inescapable basis (Pérez, 1993), they develop strategies like hitting to oppose racist and sexist ideologies. In their narratives these girls constructed images of courageous girls who were determined to fight against racial and sexist forces in their school settings. Third, these narratives call for authority figures in schools to encourage Mexican girls' resistance so they can break a pattern of marginality as learners who could otherwise explore their full potential and concentrate on establishing relations with subject matter. It is very important to highlight

the crucial role of school authority figures who not only express interest and empathy towards these girls, but most importantly, they use their power to transform the learning environment into a more equitable setting.

Partners in Science

What kind of support do girls need from educators, teachers, administrators and parents to help them become full participants in science? At a time when much of the focus of research and teacher education is subject-matter oriented, there is not much room for cross-disciplinary issues like the process of shaping identities (Hollingsworth, 1994) to enter the space of curricular studies in science education. But this is also a time when science educators endorsing social constructivist epistemologies are recommending practices such as group work, which enable knowledge construction and enhance peer interactions. It is also a time when researchers endorse group work as a sound practice in multicultural classrooms (Nieto, 1992). How are students supposed to become intellectual partners when they have a history of racial and gender tensions that divide them? I bring to the following section a set of narratives about Victoria and her partner in science, Keith, the boy from whom Victoria received an apology for calling her and others racial names.

"You listen or I'm gonna slap you."

In spite of their history of conflict, Victoria was required to engage in group work with Keith. I wondered how their intellectual partnership would function, given that Victoria had expressed powerful feelings of anger towards this boy and I was not totally convinced that an exchange of apologies would suffice to engage in an equal relationship. I asked Victoria on an interview:

Constanza: Is he a good partner in science?

Victoria: He's okay, 'cause we always have to sit with the person next to us. And he likes to get good grades, but he's a boy, you know and so he'll say: "Well you help me I already did that part."

Victoria: I'll say, "You didn't do anything you got to read that," you know I'll force him to do it because he thinks I'm gonna do it and I'm not... He wants you to do everything he just wants to get the grade and not do anything. So I say, "You got to do it or else it's gonna

be my bad grade and you know I don't get that many bad grades." He better listen to me, I'd slap him. I told him I said: "You listen or I'm gonna slap you." He'll say: "The only reason I'm doing this is because my dad told me to respect girls." He's just a goofball. He talks too much.

[Victoria-Interview-12.6.93]

Victoria's narrative depicted an "okay" boy sitting next to her: "He's okay...and he likes to get good grades, but he's a boy, you know..." Being a boy seemed to entitle Keith in Victoria's narrative to make assertions like: "Well you help me I already did that part." In response to Keith's alleged statement, Victoria constructed a portrait of herself as an assertive student who not only cared for her grades, but also enforced an equal distribution of duties in this partnership: "I'll force him to do it...He wants you to do everything he just wants to get the grade and not do anything...I don't get that many bad grades..." As the narrative developed, Victoria constructed a hypothetical "self" who took care of the situation with a slap: "He better listen to me, I'd slap him. " Keith in turn, responded to Victoria's threat by alluding to a parental mandate that raises once more the gender boundary dividing these partners in science: "The only reason I'm doing this is because my dad told me to respect girls."

Victoria's narratives call for an examination of group work in light of the ideologies that bring people together and keep them apart. As part of the science curriculum, it would be desirable that Keith and Victoria develop an intellectual relationship that would benefit both of them. But it seems like in addition to racist forces that keep them apart, Keith and Victoria will also have to overcome the forces of sexism. To overcome sexist and racist ideologies, they need support that is stronger than punitive measures, or the paternal mandate "to respect girls," or a school task where they are required to orient their interactions towards a common academic goal. In the context of group work, revealing the ideologies that inform students' interactions should become primary concerns to teachers, educators and administrators, and not just to students who deal with the problem of shaping identities on a daily basis. In light of Victoria's narratives about her experiences in

the classroom, one can gain important insights regarding the kinds of struggles that get in the way of her dream of becoming a professional scientist. In addition to struggling against the identity of a passive girls, doing as the boys say, Victoria struggled against traditional messages regarding the distribution of labor between men and women. Other girls like Alejandra and Dominic, who envision professional lives also struggled against the derogatory language attached to their identities, and the expectation that they are losers within a web of racist and sexist relations of power.

Looking at Victoria's life in school science from the perspective of her narratives, one can not help it but wonder what she was learning. Victoria, as the reader might recall, was apparently engaged in an activity about endangered species when I visited her classroom. Her narratives raise the obvious question for those interested in the exploration of subject matter issues: Where is the science? I asked this question throughout the enactment of this research study, unsure of the direction my work was taking, as girls shared stories like the ones you have read in this chapter. Over time, I understood the meaning of these stories as accounts of experience in the enactment of the science curriculum. Their stories not only spoke about the ways girls like Victoria might be drawn away from science, but specifically told us, in great detail, about the kinds of agendas that students carry on in school contexts.

Even though the stories of conflict in this chapter were not unique to Victoria, Alejandra, or Dominic's experiences, three girls whose narratives of resistance were recurrent in our conversations, their responses to oppressive forces marked a sharp contrast with girls like Magda, a girl with short tenure in the U.S., whose primary challenge in school was to assimilate; or Lupita, a girl who valued physical over intellectual work and anticipated a future in a car factory, rather than a professional occupation; or Marisa, a girl who was learning to put home responsibilities before intellectual work, and valued educational experiences for their benefit in her future role as a mother. By contrast, Dominic, Alejandra, and Victoria had constructed a dream for themselves as professionals.

Even though they were conscious of racist and sexist practices operating in their schools, these girls did not reject the school system, but they rather saw in schooling a way to revert their subordination as girls within the Mexican household, and a way to resist racist ideologies in U.S. society which deemed them marginal and ignorant.

Differing responses to schooling have been a focus of analysis for feminist theorists who question a notion of resistance based solely upon the experiences of boys, as was the case in Paul Willis' study of working class boys (Willis, 1977).⁴ For example, Jane Gaskell reminds us that women experience schools not just as sites for social reproduction of sex stereotypes and subordinate positions, but also as vehicles for women who wish to construct their own intellectual lives and careers (Gaskell, 1985). Mary Fuller's (1983, as cited in Weiler, 1988) study of Afro-Caribbean, Indo-Pakistani, and White British girls in London, reminds us that even though girls of color are conscious of racial and sexist oppression, they do not express opposition to school and the system of certification that the school represented.

Likewise, Alejandra, the girl I present in the following portrait, exemplified the kind of participation in schooling that was founded on a belief in education as a road towards a professional life. Alejandra's narratives also raised a most interesting set of issues concerning her political commitment to the members of a particular cultural/racial group. The agenda of shaping identities against the grain of dominant ideologies as part of her educational experience was especially powerful in Alejandra's narratives, a girl whose political consciousness was raised by her family and her involvement in community groups actively engaged in addressing social inequalities. In her narratives, Alejandra spoke about her ideal to construct an identity against the image of the ignorant Mexican. Of all the participants, Alejandra was the one who challenged me the most to engage in political

⁴ A review of theories of cultural reproduction and resistance (Weiler, 1988) served as a guiding framework to think about the different responses to schooling across these girls narratives.

action, to listen to the voices of Mexican girls and transform my own narratives of identity, to let her stories become a part of who I am becoming.

ALEJANDRA: PORTRAIT SEVEN

"I want people to see us as equals, and to do that, we need to educate ourselves."

Like a small jewel in the middle of a restricted residential area, Alejandra's house stood out. It was situated between two major streets lined with restaurants and business locales. This home was a bundle of activity that impacted the whole community of Cedarville. The facade told the story of a family that cared about the image it projected to the world. Alejandra and her brothers had spent part of their summer holiday painting the front dark brown. On the day I met Alejandra, she had been told that the job had to be redone. Without a hint of surprise she just reasserted her parents' expectation that it is not enough to get it done, but to get the job well done

[Alejandra-Interview-8.19.93]

The image of a young fourteen-year-old girl busily painting a dark brown facade has stayed with me since I saw Alejandra for the first time on a hot summer afternoon. The thought reminds me of the ways in which Alejandra highlights her cultural identity:

I'd say I prefer the term Chicana or Mexicana, [to identify myself] because to me Mexican-American is redundant. I mean if I lived in México I would still be American. It just irritates me that people in the U.S. think that they have sole rights to use the words. So I either go as a Chicana or a Mexicana. I would say that I go to Harper Valley High School. I'm about average height. I'm really interested in my culture. I don't believe in people talking about each other and I don't believe Mexicans fighting each other, or Hispanics fighting against each other. I think it's ridiculous, it just makes us look bad.

[Alejandra-Interview-11.11.93]

Ethnic identity was underscored in this short self-portrait of a most interesting Chicana adolescent. Unlike most other girls in our group, Alejandra's political voice was strong and clear as she spoke about her cultural roots: "It just irritates me that people in the U.S. think that they have sole rights to use the words. So I either go as a Chicana or a Mexicana." By selecting the labels Mexicana or Chicana to identify her ethnicity, Alejandra engaged in a critique and rejection of dominant ideologies, separating herself from those people who claim the label American as exclusive property of U.S. citizens. In her self-description, Alejandra recognized divisions among Mexicans and Hispanics and exposed a belief that our image is more important than our internal battles. This dimension of identity, one constructed for the outside observer, is one that Alejandra carefully protected, not unlike the girl with the can of paint who created a facade for walkers and observers to admire.

Alejandra's level of cultural awareness seemed unique among adolescents her age. She believed such consciousness and commitment to her own culture began at home and grew stronger through the work of parents who maintain ties to the Mexican community in Cedarville and keep their bonds with old friends, regardless of their economic status:

My parents taught me to be very aware of myself. I mean, my parents help me like when you're learning to walk it's usually your parents that help you do that. It's the same with becoming more aware of yourself, you know, knowing where you came from. My parents helped me take my first steps into that, and you know they still help me now. But in a way I have to help myself also. And I help myself by making sure that I become aware of these programs that I get myself to these programs also...

My parents know that even though they're better off now, that there are still people that aren't. And so my mom has a dance group to make people more aware of the Mexican culture and my dad he used to have a television show and... my mom goes to the Chicano advisory committee, she goes to their meetings, they go to all our school functions I mean my parents still talk to friends they had before that maybe didn't make it yet or anything I mean they don't just treat them like we don't know you anymore. They don't think of themselves as better than everyone else. That makes me more proud than anything else that they've done for me.

I just want to be like that too. I don't want to turn my back on people just because maybe they're not as well off as I am. Or maybe like for any other reason and I just want to help people out too. I just want to, I want to be a little like what they are, but then I want to be my own self too.

[Alejandra-Interview-11.11.93]

Alejandra viewed cultural awareness as a process which begins at home with parents unwilling to forget from where they came. She recognized how her parents had maintained their connections with their roots, in spite of their social mobility and she connected personal identity to a public space beyond the household where she was actively involved in programs that made cultural background a focus of study and a site for action. Her identity was intertwined with community political action directed toward the welfare of other Chicanos. From an early age, she moved to the rhythms of Mexican dances with a group led by its founder, Alejandra's mother. The group was an integration of adults, children, and adolescents engaged in the mission of educating people about Mexican traditions. In addition to her involvement in the dissemination of Mexican culture through

dance, she participated in educational programs for Hispanics throughout the country and served as treasurer for the Chicano Advisory Board.

Alejandra's parents came originally from Texas as migrant workers. They settled in Cedarville to complete their education and find better job opportunities. Over the years, both parents finished high school and enrolled in college. These achievements, according to Alejandra, moved the family from low income to a middle class socioeconomic status, a success she attributed to the educational opportunities available in the state, her parents' tenacity and their high intellectual abilities.

Alejandra's family portrait depicted two dedicated parents who ensured jobs and material goods by gaining access to formal, institutionalized education. She told a story about a less privileged family acquiring social and economic mobility through educational opportunities:

My parents...were migrant workers when they first got married and they became aware of the system's lots of little programs and they took advantage of those and through that they got college education and both of them have their first degree in college education and they're both working on their second degree and they both make sufficient amount of money. And so if that's not an example how education works for you, there is none. They're very hard core when it comes to education. They're very strict with us when it comes to getting something done on time and not only have your project done, have it done correctly. It's not enough just to turn something in, you have to have it done right, or else don't bother at all, cause it's a waste of your time and the teacher's time and everyone else's if you turn in any assignment that's not done correctly. If it's not something you can be proud of.

[Alejandra-Interview-6.14.94]

The family values Alejandra was constructing at home included responsibility, punctuality, and high standards in relation to the quality of her work. At home, she was part of a cultural tradition where pride was introduced as a driving force in her educational experiences and an indicator of educational outcomes. Education was an ongoing theme in our conversations about relationships with parents.

A good student was an identity Alejandra had built with satisfaction at school. At the time I met her, she was beginning her first year at Harper Valley High School.¹

¹ In 1994 Harper Valley High School reported a total population of 1553 students:

Throughout the school year Alejandra shared stories about her struggles to bring together the qualities of an educated person with the devalued image of a Mexican she consistently challenged:

I don't know about you guys, but I know me and Dominic are real lucky cause I know that our parents, both of our parents...I know that her family is really involved in the culture and they teach her a lot, they tell her, they make her understand things. And my parents are like that too, they help me understand my culture and stuff so that I'm not just another ignorant Mexican that's growing up not knowing where I'm gonna go or anything, just thinking well nobody cares you know, all this stuff. My parents don't want me to be another statistic that says minorities, you know, SATs declined again or something like that, cause there's a lot of bad things against us.

[Conversation-10. 1.93]

Consistently, Alejandra placed her personal experiences as a student in relation to her social memberships. Her responses to education were tightly connected to her position as a Mexican and a minority. I first wondered if the above statements meant that the educational system offered her a way to opt out of her membership to groups with which she did not want to associate herself. The "ignorant Mexican," the failing minority who made SAT scores decline were identities she did not want for herself. However, it seemed as if she perceived these conditions as odds against her, "there's a lot of bad things against us," and instead of separating herself from the ethnic group where she belonged, she was attempting to transform derogatory images connected to her Mexican identity.

In contrast with other girls in our group, Alejandra displayed unique and helpful ways of making sense of the purposes of knowledge learned in school. In our conversations she invariably contributed important insights to make sense of students' experiences in science. As an example, let us take a look at the following dialogue:

Constanza: Why do you need learn how to convert centimeters to meters.

Marisa: So we can know...in the future?

American Indian 2%, Black 18%, Asian 8%, Hispanic 18%, White 54%; a male/female ratio among Hispanics of 138/140. The percentage of students with satisfactory scores on the MEAP test reported for 1993-1994 were: math 20.7%, and science 37.2%. The percentage of students whose financial resources made them eligible for free and reduced lunch was 35%.

Victoria: So we can know when/to use it?/

Alejandra: Cause America is the only, industrial and devel excuse-me industrialized nation that still uses that old way of metric system, whatever, I don't know what it's called. I don't know, inches and yards and feet. And in the metric system it's centimeters, meters, decimeters, they're all in forms of ten and a hundred you know.

[Conversation-10.15.93]

Marisa's response to the meaning of her own experiences in science earlier that week was most typical among the girls in our group. Science knowledge was often viewed as something that would translate into vague future benefits. Instead, Alejandra made sense of educational experiences in science by looking at the social context where we lived. She gave meaning and direction to learning the metric system by pointing out that Americans need to learn the ways of measurement that were currently used in the rest of the world.

Alejandra not only made sense of her educational experiences in light of her nationality and ethnic origin, but also her affiliation to a family where she found guidance and support to pursue big dreams for herself:

We worry about her. We don't want her to have bad habits. We always want her to be respectful of other people. She's our youngest daughter and she is our only daughter...[They] worry about if they taught me everything that I should know.

[Alejandra-Interview-11.11.94]

As Alejandra revealed the parental voices she carried with her, she expressed a set of concerns and manifested responsibilities her parents assumed in raising a daughter. Being polite, responsible, respectful, and courteous were all qualities of the good Mexican girl Alejandra and her parents were crafting. Her parents' participation in the whole process of her becoming a good girl and woman was strengthened by her position as the last sibling in the family, "She's our youngest daughter" combined with her unique gender identity, "She is our only daughter...."

In her upbringing, Alejandra set herself apart from her male siblings:

Constanza: Do you think it makes a difference that you are a daughter and not a son?

Alejandra: I think that it does. As much as people try where it doesn't matter if you are a man or a woman, it still matters. The first thing people if you walk in a room they will take note of what's your skin color, you're a man or a woman and then your race. I think [my parents] probably think that I'm more vulnerable than my brothers are and susceptible to things than my brothers are. And to me I think that's kind of silly. If there's any person in my family who I feel is the most child like person like just a little kid, is my brother; he's just a little kid. I mean he's nice and everything, there's nothing wrong with him. But I would think that they would worry about him more. But I mean since he is older than me, since he is a boy and... you know that's his responsibility. He's such a little kid though...

[Alejandra-Interview-11.11.93]

Alejandra consistently marked the gender border in her stories about home life.

However, her narratives described a girl who would not simply accept traditional sex roles but challenged any form of differential treatment:

I do all the housework but I get paid for it also. Cause my brothers both have jobs 'cause my parents they used to try to tell me, "well how come Jimmy, they go to work and everything so you should try to do the dishes and stuff." I was like unless Victor and Jimmy be giving me some money they can do their own chores. "Cause I'm not their slave and I'm not getting anything out of this. [Laughter] ...My mom told my dad she was like I think we should start paying her.

[Conversation-10.1.93]

While becoming a girl and woman in her household, Alejandra learned that boys were perceived as less vulnerable and more apt to handle responsibilities, even when their personal character indicated lack of maturity. During a conversation with other girls in our group, Alejandra confirmed that this differential treatment was conducive to a more restricted life for her, as opposed to her brothers' and she underscored the unequal distribution of privileges among the siblings in her family:

And I'm the one that acts the most responsible out of all of us. I'm the one that gets the best grades. I'm the one that listens to them I'm the one that if there's something wrong in my class or something and I go down and try to get things straightened out. I go talk to my counselors, I'm the one that does all the things I'm expected to do. But just because I'm a girl, I realize I'm younger and they won't let me do

everything Victor does. Jimmy is a year older than me and they let him date...but they don't reinforce what they say. But with me they are real strict.

[Conversation-10.15.93]

Alejandra made sense of her parents' attitudes towards her as an issue of personal safety and a consequence of their social location in a broader context where women, as opposed to men, were portrayed by the media as the victims of violent acts:

I think it's because in the news there's all these things about such and such happened to women. And I know that happens /?/ and you really not hear that much about men unless men fighting with men in which case both people are somewhat involved.

[Alejandra-Interview-11.11.93]

The vulnerable image of a woman constructed around Alejandra did not preclude her from searching a different path for herself. Shortly after we met, Alejandra began to prepare for her quinceañera party, an event that was celebrated at a Catholic church and was followed by a dance at a local hotel. Like so many Mexican traditions, preparations for this celebration involved family and friends who offered help with a variety of contributions. A girl turning fifteen was initiated into adolescence through the rite of a quinceañera party. In some homes, a quinceañera also represented initiation to womanhood. However, Alejandra did not view herself as someone across the boundaries of womanhood. Rather, she described herself as someone at the boundaries, "in between" a girl and a woman:

Alejandra: I see myself as a young lady. I'm neither [a girl or a woman], I'm just in between right now, so I would consider myself a young lady right now.

Constanza: When do you think you'll become a woman?

Alejandra: I think when I'm old enough to support myself. When I start doing the things that I really want to do. Or when I finish doing the things I want to do and I accomplish what I want to do. When I can support myself and feel sure of myself and know exactly which direction I'm going in. I think that's when I'll be a woman.... To me, a woman is someone who is very self-sufficient, or who knows what they want out of life, you know, and who is not afraid to go out for it. Who doesn't always have to hold back and wait 'til someone else pushes her into it. Someone who has their own

opinion and their own mind. Just someone who is basically themselves and not what someone else wants them to be.

[Alejandra-Interview-11.11.93]

Unlike other girls like Lupita who described the process of becoming a woman as a loss, Alejandra depicted a process of growing strength and self determination. I celebrate with awe Alejandra's vision of woman: a self-actualized individual who enjoys economic and intellectual independence and the freedom to set her own goals and fulfill them. Her image awakens my own desire to be just like the woman she describes. And here I am, much older than she, more experienced, and so removed from feeling I am that woman. Her words bounce against so many women's experiences to remind me of our moral obligation as parents and educators towards young women who still dream.

Listening to Alejandra's themes when she talked about her future life, I became more aware of the social forces that might constraint her full participation in college life, but I was also encouraged to hear a "young lady" crafting a future as a professional woman with ambition and self drive:

I would like to be a lawyer and also my parents said that they would help support me if I decide to become a lawyer and both my mom and dad said that they would pay for some of my classes if I decided to become a lawyer but I said that I would probably join the national guard you know. But they [parents] said that I could live at home but they wouldn't pay... for me to live in a dorm. Because of all the things that go on. Plus it's ridiculous, because if I go to UF, you know it's not even that far. And they also said that they would allow me to use their car. So that I may drive back and forth. Drive to wherever I want. And so I probably stay at home afterwards and then just go to school.

[Alejandra-Interview-11.11.93]

Although the dream of becoming a professional woman was fully supported by parents willing to provide economic resources, transportation, and housing, leaving home to attend college was still a sensitive issue for a "vulnerable" Mexican girl. The threat of what might happen in public spaces where she would be exposed to acts of violence was still one that limited her options and kept her close to home. However, it was evident to me that her family's commitment to education was much stronger than its fears. I left Alejandra confident that she would pursue career.

Alejandra was indeed a border crosser who challenged traditional gender roles, and stood up against racism. She positioned herself as a Chicana, a young lady of Mexican origin, aware of the odds against her, but confident that she could push the boundaries of social forces that constrained her. Alejandra's narratives reminded me that identities were constantly in the process of being shaped, challenged, questioned. Alejandra's were stories about a world where women and people of all races claimed their rights loudly and confidently. In the quotes that open this portrait, Alejandra spoke about education as a liberatory pathway towards equal treatment of people like herself, who claim the labels Mexican and Chicanos to identify their ethnicity. When I heard Alejandra's expressions of growth and independence, self confidence and determination, and her sophisticated level of awareness of the social forces that oppressed her, I could not help but wonder how she arrived here. What circumstances allowed her to become a critical narrator of experience who challenged social norms and took unavoidable risks to change the way things are? Furthermore, I could not help but wish that girls like Selina, Lupita, Marisa and Magda had developed similar responses to the inequalities they faced daily.

How can teachers, administrators and educators foment responses to education, in particular to science education, that promote the kinds of change Alejandra envisioned? In light of the narratives we have heard in this dissertation, what should be our commitment towards girls who still dream and those who have not crafted big dreams for themselves? In the chapter that follows I take a comparative look at the other participants in this dissertation to shed some light on these questions.

Chapter 8

SHAPING IDENTITIES IN SCHOOL SCIENCE

Through the coming together in our difference, and with our memories and our stories, we may bring a new generative power into being. Refusing the "normal," we may even create generative school with open spaces where diverse persons can invent projects of their own and, by doing so, choose themselves.

(Greene, 1993, p. 253).

This dissertation is a study about the social identities of "young ladies" of Mexican origin and their interactions with science. To learn about the meaning of science in their lives I began by asking who are these "Hispanic," "Latinas," "Mexicans," "Chicanas" commonly grouped under the categories of "girls and minorities," whose identities characterize marginality in science? By asking who are the people grouped under the category of marginal, I at once explored and proposed a politics of inclusion in science which focuses on identities, rather than in depth examinations of subject matter content. (See *Figure 1*). One would expect this type of dissertation would enlighten our understanding of the needs of a particular group of people and contribute to their characterization. It is important to note however, that the most relevant findings stemming out of this study led me towards an examination of difference within the group of girls of Mexican origin who participated in this dissertation project.

Rather than seeking common characteristics among girls of Mexican origin, in this chapter I attempt to weave together two themes emerging from this work which draw our attention to diversity within a group that shares the same gender and ethnic affiliations. First, I will draw attention to the *fronteras*/borders where the participants' multiple social

identities intersect with science.¹ The second theme pertains the placement of identities at the center of our pedagogical endeavors. Throughout the chapter I highlight a most challenging set of issues stemming from placing the identities of girls of Mexican origin at the center of our practices of doing research, designing educational policy, and teaching science. It is my hope that this final chapter awakes in the reader a recognition of difference conducive to re-think school science as a piece of the complex web of power relations affecting the lives of girls of Mexican origin.

The *fronteras*/borders of nationality, race, ethnicity, class, and gender

Las fronteras, the edges or intersection of cultures where girls of Mexican origin negotiate their Hispanic, Mexican and Chicana affiliations, where they move from girls, to young ladies, and women; where girls dance between the categories of ignorant to educated; where they transit between passing as white to developing a sense of pride as women of color; where they embrace the promises of education to move up from lower class locations. At these fronteras girls encounter science.

The narratives of identity collected in this dissertation connect the participants to their social locations. Interestingly each one of the participants placed herself in relation to different collective *we's* at different times and places. Their diverse stories of identity were mediated by social categorizations like race, class, ethnicity, gender, age and student locations embodied in one life. From their diverse social locations each girl contributed a particular set of meanings that lends itself to explore a number of obstacles and possibilities for intellectual growth in their encounters with science. At times, girls highlighted their locations as members of low income groups, or they often talked about their racial status, or gender categorizations as salient dimensions of self in their encounters with school science. The narratives constructed by girls of Mexican descent could be characterized as particular to each individual, yet sharing common threads connected to group

¹ Science is broadly defined by participants in their narratives. Definitions of science include: a grade, an activity, a school subject, a career, a body of knowledge, a set of methodological principles, and a broad "umbrella," a way of knowing that includes everything else.

memberships. It is interesting then to go beyond the question of commonality, -- what do students of science who happen to be females and also trace their origins to Mexico have in common? -- to ask about the differences within the group which might account for the wide range of relationships the participants established with schooling and knowledge of science.

To enlighten our understanding of diversity and commonality in the construction of the meaning of science for girls of Mexican origin I turn to the literature on social identities. The work of Aída Hurtado (1994, 1993, 1987) on the adaptations of Mexicans in the United States, offers helpful insights to understand the varied relevance of social location on the meaning of science in the lives of girls of common Mexican origin. I find this work particularly helpful in that it examines the notion of ethnicity in relation to multiple dimensions of social identities like nativity and language, gender, race and class locations:

To isolate one criterion as capturing the essence of ethnicity is to artificially limit and simplify its nature and to represent the Mexican descent population as a homogeneous aggregate. (Hurtado, 1993, p. 133).

Hurtado's work is based on a notion of social identity understood as "the aspects of an individual's self concept that derive from one's knowledge of being part of categories and groups, together with the value and emotional significance attached to those memberships" (Tajfel, 1981 as cited in Hurtado et al., 1994, p. 131). Tajfel's theory of social identity predicts that the identities that are more problematic become the most significant psychologically. Problematic identities, according to Hurtado et al., are

...more easily accessible; individuals think a lot about them; they are apt to be salient across situations; they are likely to function as schemas, frameworks or social scripts. (*ibid*, p. 132)

Identities that emerge around problematic status like immigrant, manual worker, Mexican, Spanish speaker and those that reflect a political, collective construction of self like Chicana and working class, would be the most psychologically implicated in the

cultural adaptations of Mexicans and Chicanos.² By contrast, the authors raise the issue that unproblematic categories such as "white," one which is socially valued and privileged, may not even become a social identity.

In contrast with essentialist notions of identity which would lead us to understand the group of participants in this dissertation as a homogeneous aggregate, this multidimensional view of ethnicity allows us to see in this group of girls of Mexican descent the intersection of multiple dimensions of their identities and the impact of these identities on their diverse responses to schooling, in particular to science.

Let us take a look at the ways this conceptual framework can shed some light to understand diversity in students' responses to schooling. From their diverse social locations each girl contributed a particular set of meanings that lends itself to explore a number of obstacles and possibilities for intellectual growth in their encounters with science. The participants in this dissertation shared stories of identity that reveal two qualities of social affiliation which are worth exploring in any discussion intended to enhance the quality of encounters between adolescent girls of Mexican origin and science. First, these stories reveal *fronteras*/borders which act as barriers, they are pre-made texts loaded with pre-established expectations. Second, their stories delineate a quality of social membership, the *fronteras*/borders where girls contested prescriptive social norms to give way to their individual desires (Muñoz, 1995). Girls encounter science at these *fronteras*, where they are at once stifled and enlightened with possibilities. What did their stories of self teach me about the meaning of science in these girls' lives?

All seven participants in this dissertation study shared recurrent narratives about their ethnic identities which revealed a multidimensional notion of ethnicity that goes beyond identification with nationality (Hurtado, et al., 1994). Aside from Magda, a Mexican by birth and myself, a Colombian, all the other participants were born in the U.S.

² This work emphasizes differences between Mexican and Chicano identities and their corresponding cultural adaptations. The authors identify Mexicans as first generation immigrants, while Chicanos comprise longer term residents born in the U.S.

In spite of a common U.S. nationality, the participants who shared the same place of birth varied in the ethnic labels they claimed for themselves. Dominic, a first generation U.S. born, talked about an identity in the making. In her narratives she told us how she broadly defined herself as "Hispanic," then changed to "Mexican," and later, through a process of political awareness, became "Chicana". Lupita, first generation U.S. born on her father's side and second generation on her mother's side claimed the labels "Mexican" and "Chicana." Of the second generation born in the U.S., Victoria claimed the label "Hispanic," as a language resource to set herself apart from derogatory categorizations. Alejandra identified herself as "Mexicana," but expressed a preference for "Chicana." Selina, first generation U.S. born on her father's side, but third generation on her mother's side claimed the label "Mexican." And, Marisa, a girl whose "Mexican" identity linked her to a set of grandparents who came from Mexico and another set from Texas. What does this diversity of ethnic labels and histories tell us about students' experiences in school and their connections and points of rupture with science? Why should this diversity be recognized and honored school settings to better understand our students' connections with the subject matter of science?

The above overview of ethnic identity labels reveals that nationality was not the only dimension of self identity which determined these girls' affiliations with people of Mexican origin. Interestingly, these girls maintained a Mexican identity over the years, even after two generations born in the U.S.. Furthermore, this diversity of ethnic labels revealed a political dimension of ethnicity that changes overtime. I draw attention to diversity of ethnic labels because these labels represent a dimension of social identities which was often connected to school experiences in the participants' narratives. Notions of ethnicity became a central issue that might explain students' diverse responses to schooling.

A striking difference across the participants in this dissertation was their level of commitment to schooling. Likewise, these participants varied in their loyalties to Mexican people. At one end Magda, a recent immigrant who faced the challenge of assimilation, was

breaking her bonds with family, with her native language and the possibilities of initiating friendships with other Mexicans. These points of rupture with her past were also evident in school science. For example, Magda shared with the group a number of stories about her interactions with science, where she claimed to learn "nothin." She also spoke about the bilingual program where she no longer belonged because she was "too smart." Magda continuously received the message that success in school was accompanied by breaking away from Mexican friends and traditions. Her closest friendships were built with recent immigrants from Asia living at the borders, facing the imminent need of becoming more American, learning the dominant language. At the same time, Magda maintained an attachment to her homeland, México, a place where she still had friends and relatives. Throughout our conversations and interviews, Magda constructed narratives of self which revealed how she buried her history, her language, her old social affiliations and her voice in an American school setting.

One would assume that the ethnic identity of Mexican would render different meanings for Marisa, a third generation born in the U.S.. Marisa was a fluent English speaker and a native of Cedarville. Unlike Magda, when she went to school Marisa did not face the same challenge of abandoning her home language and her bonds with her homeland. However, in Marisa's narratives, the need to break bonds with Mexican friends was also linked to a notion of success in school. Both Magda and Marisa were unable to escape the "dominant discourse of identity" (Pérez, 1993) that marked Mexicans as non-successful and made them victims of racial slur at school. Marisa's stories about her performance in school revealed a particular set of beliefs about the meaning of schooling for its trade value. She wove into the meaning of science in her life a notion of trade value that she connected both to immediate and future benefits. Marisa's accomplishment of improving her grades in science, for example, illustrated how she connected science to the symbol of a grade she traded for the benefits of earning a trip to Chicago or a quinceañera. Quite interestingly, Marisa's stories revealed an ideology of domesticity in her belief that

knowledge of science is valuable as a resource in her future role of mother. This "domestic ideology" (Gaskell, 1992) also shaped Marisa's priorities of doing domestic over intellectual work, engaging in social life outside the family, or after school enrichment programs.

Lupita's narratives about schooling and her relationships with science shed yet another particular set of insights. As the reader might recall, Lupita brought to the notion of ethnicity the dimensions of race and gender intertwined in her narratives. When she spoke about childhood, for example, Lupita revealed a progression from a girl living by the racist belief that being White is better than being a person of color. It was quite interesting then to hear Lupita's tracking of the construction of a Chicana identity, one she adopted over time, to embrace race as a dimension of self that she associated with power and pride. This transformation from shame to pride, seemed to be gained through Lupita's affiliation to a collective struggle among Chicanos of dismantling racist ideologies. However, Lupita's affiliation to the Chicano movement was more marginal than the kind of involvement manifested by other girls in our group whose level of participation in Chicano groups was continuous, explicit and conscious.

Lupita's responses to schooling were quite problematic. She appeared to be successful in school by simply raising her hand to answer a question, or taking on the role of clerical worker. Throughout our meetings, Lupita never expressed concerns about her ability to succeed in school, despite her low grades. At school, Lupita struck me as someone who was learning to get by with a minimum amount of intellectual work. In fact, she reinstated her preference towards physical, rather than mental work, a theme played by reproduction theorists who view schools as places where students learn to reproduce their class positions and they are taught to adopt a work discipline (Bowles and Gintis, 1976). Indeed, as the reader might recall, Lupita talked about the connection between grades as indicators of right or wrong attitudes towards work, revealing an already unchallenged set

of beliefs that connected her participation in school to her chances of getting a job in the future.

My observations in Lupita's classroom and her narratives about the meaning of school echoed the theme of reproduction of social inequalities, documented by researchers like Paul Willis (1977) in his study *Learning to Labor*. But Lupita's narratives were quite distinctive in that they spoke about education in connection to her chances of finding the man of her dreams, doing physical work, and dressed in baggy clothing. Thus Lupita's narratives were limited by the strictures of class and gender which intermeshed in her preview of a future life by the side of a working class man.

I was also struck by the ways Lupita constructed an ethnic identity connected to traditional gender roles. For example, she brought together the dimensions of gender and ethnicity in her portrait of the Mexican girl, where she poignantly described the reproduction of gender roles and the perpetuation of gender inequities in the realm of a Mexican home:

The Mexican girls... they have to do everything because the mother, she's had, probably had five kids already. The Mexican girl probably has to wash the kids, bathe them, vacuum and all that stuff because the mother has to work and prepare food for the father.

[Lupita-Interview-7.15.93]

In spite of the differences in family size in their respective households, all three girls, Magda, Marisa and Lupita, were expected to adopt traditional gender roles like taking care of younger siblings, cooking and cleaning. Their narratives about home life often underscored the unequal distribution of rights and duties between males and females at home. Interestingly, these girls seldom pointed at their ethnic origin as a source of distress when they spoke about home life.

All three girls highlighted the issue of economic constraints that limit their opportunities to enroll in after school and summer programs and further reassert their role as housekeepers and baby-sitters. Furthermore, except for Magda's father who was a school teacher in Mexico, these girls' parents had not pursued education beyond high

school and they were currently employed in low-skilled jobs. In their narratives, these girls constructed future scenarios where they located themselves in similar occupations as their parents, with blurry visions of a future as professionals, but a clear understanding that education would help them get clerical or factory jobs or, in Magda's case, an elementary teaching position. For Marisa, Magda, and Lupita there seemed to be a common understanding that their grades would impact their chances to get these jobs. All three participants attended school regularly, showed up in class, and attempted to complete their work as required by their teachers. As a result, they all passed their science course. In most cases, these attitudes and their results awarded them a notion of success in school limited to a minimum level of participation.

By contrast, Alejandra's commitment to education was founded on a different set of beliefs and it was motivated by seemingly different goals. For example, she said:

I don't want people to say, "There is another uneducated Mexican." I want people to see us as equals, and to do that, we need to educate ourselves.

[Alejandra-Interview]

In this quote, and throughout her narratives of experience, Alejandra revealed educational goals intended to challenge stereotypical images of Mexicans. She recurrently constructed normative narratives that ended with statements about the ways one should act in situations where your race gets demeaned, where you are challenged as someone who is "ignorant," or "stupid." A Chicana by choice, Alejandra viewed schools as places for political struggle where she confronted overtly the forces of racism and sexism with consistent strength, self confidence, and determination. Alejandra's belief in education as a ladder to achieve social mobility was accompanied by a belief in the need to debunk the myth of the ignorant Mexican. There was also an element of alliance and commitment to groups that gathered around the theme of culture like the dance group founded by her mother, which perpetuated a strong sense of positive group identity. Political involvement became a conscious choice for Alejandra, one that informed the reasons why she went to school. In addition, Alejandra contested traditional roles for the Mexican girl, and resisted

the ideology of domestic work that places women as opposed to men in the role of doing housework. Given her class position and her parents' education, Alejandra was expected not only to finish high school but to continue higher education with the financial support of her parents.

Political consciousness and parental support for higher education also characterized other households where parents placed emphasis in maintaining Mexican traditions, participated in community groups aimed at supporting Chicanos, and at the same time expressed commitment towards education. This was the case for Dominic, whose political involvement was driven by her membership in social groups geared for Hispanics, Mexicans, and Chicanos. Like Alejandra, Dominic was also supported by her parents' financial position and their education to move beyond high school.

Selina was another girl who expressed a strong desire to continue her education beyond high school. Interestingly, Selina's goals were moved by the goal of surpassing her mother's limited educational opportunities. Two qualities of her household struck me as relevant conditions which supported Selina's dreams of becoming a professional. One, the political commitments of her grandmother, a community leader attending to the needs of Chicanos in the area of Cedarville, who prided herself for putting all of her fifteen children through school, and second, the influence of her father who was a successful professional.

Victoria's stories about schooling highlighted her desire of becoming a professional scientist. Her mother's participation in our conversations, raised for me the issue of transgressing the traditional gender roles imposed on Victoria's future dreams. The narratives informing Victoria's views on gender were consistent with the literature on Mexican families where women are portrayed as devoted wives, mothers, daughters who satisfy everyone else's needs while denying their own (Nieto, 1977). But Victoria's stories of identity were not mere reproductions of traditionally defined sex roles, reminding us that "there is no single story of identity," (Muñoz, 1995, p. 256). Her stories also revealed identities shaped in the context of a middle class family which valued college

education and supported her dream of becoming a professional scientist. These latter narratives revealed the ways Victoria verbally suppressed social identities such as traditional sex roles to embrace the dream of a career. I see in these latter narratives a gender identity growing from an emergent critical consciousness (Freire, 1970) where Victoria challenged the social dimension of woman and began to make some negotiations to cope with competing definitions of success as a professional and success as a woman.

In their respective school settings Selina, Victoria, and Alejandra enjoyed the reputation of being excellent students. Interestingly all of these girls expressed views on the purpose of schooling and the purpose of engaging in science in relation to broader political issues like the underrepresentation of people like themselves in higher education and the need to debunk the myth of the uneducated Mexican. In education, they saw a way of achieving a positive sense of distinctiveness against the grain of dominant ideologies that characterize Mexicans as uneducated, underrepresented, and marginal in school settings.³ This form of collective consciousness and struggle within school settings which is also a dimension of activism among African-American women deserves further study and stronger institutional support.

The theme of shaping identities in school science against the grain of dominant ideologies took a more personal direction in Dominic's narratives. Throughout her first year in high school, Dominic carried on the agenda of shaping a self that was "capable," against an image of self as someone who failed science. Like Victoria, Dominic was also supported by a dedicated mother who searched educational opportunities that would help move her daughter ahead. Both mothers had access to inside information that their daughters appreciated as unique and advantageous to pursue higher placements in courses and enroll in special programs. Victoria and Dominic shared a perception of self as "smart" and "capable," a quality some girls connected to their ability to do well in science.

³ The work of Patricia Hill Collins (1990) enlightened my understanding of Selina, Victoria, and Alejandra's schooling experiences as expressions resistance to dominant ideologies. In spite of their position of compliance and acceptance of school norms, these girls expected in education a way to subvert traditional gender roles within the Mexican household, and a space for self-affirmation and definition.

Across Dominc, Selina, Alejandra, and Victoria's narratives there was a common sense of commitment to education for self improvement and a shared goal of becoming professional women. Like Lupita, Magda and Marisa, these girls were also successful students in that they were making it through middle school and they expressed commitment to finishing high school. However, the purposes of schooling for these girls varied in important ways. At school, Dominc, Alejandra, Selina, and Victoria engaged in a struggle to shape confident, capable selves, and a process of constructing identities against the grain of derogatory images of their social groups. At the same time, Magda, Marisa and Lupita engaged in a process of disconnection, where participation in schooling was reduced at best to completing the work assigned by authority figures, instead of an opportunity for self improvement either as individuals or members of social groups.

The narratives in this dissertation reveal that the education of adolescent girls of Mexican origin cannot be approached on the basis of the assumption that this group constitutes a homogeneous aggregate. These girls' narratives challenged multicultural approaches to education which rest on the assumption that minority groups failure in schools can be solely explained on the basis of their experiences of cultural dissonance between home and school (Nieto, 1992) or the construction of opposition cultures, as suggested by John Ogbu (1987). As a collective, the narratives in this dissertation direct our attention towards an in depth understanding of the ways each one of the participants in this study weaves differing, competing, resistant and reproductive notions of their identities into the agenda of shaping themselves and their social groups in the context of schools.

Placing Identities at the Center

The narratives of Mexican adolescent girls in this dissertation study call for pedagogies that place their voices at the center of our research practice and pedagogical endeavors. They raised challenging issues for those of us engaged in teaching science, doing research, preparing teachers and administrating schools where science is taught. Let

us now explore some possibilities on how these narratives can inform the practices of teaching and doing research in science education.

Listening and reading students' stories I learned more about their interpretations of the world, their historical situation and culture, understood in its multiple dimensions, than I did about their particular understandings of science. This work illustrates how students' voices in our research projects, or for that matter in our classrooms, can open up avenues that give us access to their historical and cultural roots. As Peter McLaren asserts,

A student's voice is not a reflection of the world as much as it is a constitutive force that both mediates and shapes reality within historically constructed practices and relationships of power...Voice, then, suggests the means that students have at their disposal to make themselves "heard" and to define themselves as active participants in the world. (McLaren, 1989, p. 230)

A notion of voice as a means that students have to define themselves as active participants in the world should be central to a politics of inclusion in science, at state and national levels, but most importantly in our science classrooms. Research projects and pedagogies that center around students' voices and their notions of identity can help us better understand the political dimensions of teaching in the interactions with adolescent girls of Mexican origin. Rather than leading in the direction of characterizing groups, or constructing images of exemplary models that prescribe relationships to people from different cultural backgrounds, pedagogies and research practices that center around the identities of our students enhance the possibilities of our understanding the multiple dimensions of self that enter into a relationship with teachers, students, and school science.

Throughout this dissertation I expressed a strong level of discomfort in de-centering science from this research study. It is my intent in this last section to draw attention to the relevant implications and powerful messages stemming from research that de-emphasizes science. I conclude by endorsing a practice of inclusion of science in the lives of our students that begins with questions of purpose as a pre-requisite to define and attain the goal of science literacy for all.

Purposes of Schooling

The narratives constructed by the participants in this study remind us that schools are not simply sites for instruction, but rather sites of race, ethnic, and gender conflict. This finding echoes a premise of critical pedagogy which sees in schools as a place in which select groups of students are favored on the basis of their race, class, and gender; but also as agencies for self and social empowerment (McLaren, 1989). The narratives in this study raise the issue that science classrooms do not escape the kinds of conflict across gender, class, and racial groups that are a central focus of critical pedagogy. Critical pedagogy with its goal of "empowering the powerless and transforming existing social inequalities and injustices...Provides historically, cultural, political, and ethical direction for those in education who still dare to hope" (McLaren, 1989, p. 160).

I believe that the premises of critical pedagogy apply to the teaching of science, as much as they apply to social studies. Unfortunately, teaching and doing research that aims at social change is often regarded as the scope of disciplinary areas different from science. Usually those who are interested in the transformation of social dynamics are grouped under the discipline of social studies. Contrary to these practices, these girls' voices tell us it is imperative to look at the science classroom in its multiple functions, not just a place where science skills are taught and acquired, where scientific knowledge is imparted, or constructed, but as a place where uneven relations of power are maintained and contested. A fundamental set of question for teachers, educators and researchers would be: What is the purpose of learning science among a particular group of students? Is the meaning of science the same for all? Will it ever be the same? Do we want it to be the same? It is imperative that we recognize that the diverse purposes of schooling challenge our own educational goals. Furthermore, we must begin to question the assumptions informing our dominant forms of pedagogy and question the different forms of discrimination inherent in present-day schooling and social life" (McLaren, 1989).

The empowerment of students, a goal of critical pedagogy, is understood as "encouraging them to explore and analyze the forces acting upon their lives. It means respecting and legitimizing student's own voices in the classroom." (Weiler, 1988). Interestingly, in this study, the participants were the leading force that encouraged me to explore and analyze the social forces which shape their lives. It was through their construction of narratives about conflict in schools and our dialogue, that they contributed to develop my own awareness of racial discrimination, sexist biases, class, gender, and racial interests and power, which they know, and confront on a daily basis. The narratives in this dissertation tell us about the participants' awareness of unequal gender, class, and racial power in schools, and they also draw our attention towards the social agenda of crafting identities, a most relevant purpose of schooling, that encompasses the purpose of learning science, and gives meaning to educational experiences.

Crafting Identities

Listening to girls of Mexican origin I learned about the ways they engage in the process of shaping their social identities as part of the school agenda. Throughout these girls' narratives I heard the participants in this dissertation talk about the ways parents, teachers, peers, and administrators alike are involved in this process of crafting social identities, regardless of their level of awareness about their complicity in this process. I heard about students delineating the boundaries of race, ethnicity, and gender to describe each other, to compare, to create alliances and separate themselves into social groups in school settings. I heard about "Hispanic" administrators whose loyalty was trusted. I heard about parents involved in community groups that support Chicano communitary struggle. I heard about Dominic's process of shaping an image of a "capable" person in the science classroom. These narratives suggest that all partners in education, including science teachers, are involved in co-authoring stories of individuals and social groups. As we co-author these narratives of identity, we can either limit, constrain and reproduce dominant disempowering ideologies, or we can create spaces for possibilities, to generate and

construct, to disrupt, transform and reflect on the narratives of identities we shape in our classrooms.

This finding raises an interesting issue in regards to the acknowledgment of social identities in our classrooms. For some teachers the recognition and celebration of individual identities is problematic because this recognition presumes unequal treatment and a violation of democratic ideals. This belief was quite evident to me when I addressed teachers to help me locate potential participants for this study. Some teachers responded to my query about the ethnic origin of their students by asserting that a notion of difference along the lines of ethnicity was deliberately ignored as part of their knowledge base concerning their students. It became clear to me that distinctions along the lines of ethnicity are considered by some teachers as manifestations of prejudice and racism. For this reason, some teachers endorse a code of silent erasure of identity which strikes me as an unsuited mismatch between teachers' intended agendas and the agendas they enact with students in their classrooms.

As science teachers, our ethical commitments must include dismantling ideologies like color blindness which may result in "denying the very identity of our students... making them invisible" (Nieto, 1992). Committed science teachers who view identities as central to their practice must be prepared to embrace social change and regard their practice as political action. As Marilyn Cochran-Smith (1995) argues,

What we need in teacher education is not better generic strategies for "teaching multicultural education" or "teaching for diversity" nor more lessons about basket making and other customs in non-Anglo cultures. Instead, I propose that what we need are generative ways for prospective teachers, experienced teachers, and teacher educators alike to work together in communities of learners to explore and reconsider their own assumptions, understand the values and practices of families and cultures that are different from their own, and construct pedagogy that takes these into account in locally appropriate and culturally sensitive ways. (p. 494-495)

This collaborative effort to enhance my understanding of the meaning of science in the lives of girls of Mexican origin led me to focus my attention on the impact of institutions like the family, or community organizations outside schools, where some of the participants in this dissertation found the support and resources to disrupt, transform and

appropriate narratives of identity. Alejandra, for example, shared with us a history of performing in her mother's dance group, which preserved and disseminated knowledge about her culture. Dominic talked about the support of a family committed to the transformation of negative images of their cultural background, and the driving force of community groups which have focus around cultural traditions. Selina was impacted by her grandmother's commitments to Mexican organizations in the Cedarville area. These girls' positive responses to schooling were founded on their political ideal to transform the world around them, to overcome the obstacles of racist and sexist practices, and to challenge ideologies of power that undermine their opportunities and their rights.

This finding supports school programs which honor the cultural traditions of their students, especially those who are most directly impacted by the forces of racism, sexism and classism. But these programs need to become integral to the life of students in schools, rather than additional extra-curricular activities. This is particularly true of science, a space that is seemingly isolated from the impact of occasional celebrations of Black and Mexican heritage. Drawing from Alejandra's narratives in particular, I was encouraged to believe that many students do not want to become mere spectators in the process of schooling, but active "dancers" who find a purpose in schooling intimately connected to social change. An interesting line of inquiry for teachers and researchers would be to ask in what ways students' political commitments and awareness of social inequities contribute to make sense of their experiences in science and enhance their critical, active participation in science classrooms. Such line of inquiry focuses our attention on the identities of these girls, rather than the development of strategies that attempt to change perceptions of achievement among girls and minorities or change patterns of participation in the manipulation of laboratory equipment.

As a tenet of feminist pedagogies a notion of social identities needs to rest on historical knowledge. Patricia Zavella (1994) advises that we begin by analyzing the historically specific structural conditions constraining women's experiences and link these

conditions to the varieties of ways in which women respond to and construct subjective representations of their experiences. If we apply this suggestion to the construction of science curriculum, we would focus on Victoria, for example, to ask what structures frame her experiences and what obstacles get in the way of her dream of making science central to her life. What trade-offs are implicit in her career choice? This kind of analysis recognizes there is a source of variation rooted in history: settlement patterns, generation, class origins, racial features, gender and sexuality, language use at home, and nationality (*ibid.*). If we orient a politics of inclusion towards attending to historical conditions, we would address questions like: When is it useful to make comparisons between women with different cultural backgrounds but in similar social locations? What purpose does it serve to categorize all of these very disparate groups? Whose interests get served? When is it appropriate to think of these Mexican adolescent girls as Chicanas, Mexicans, or Hispanics and when it better to specify a particular regional form of identity? (Zavella, 1994).

A focus on identities has powerful implications to parents, teachers, administrators and researchers for it reminds us of our participation in co-authoring the stories of self constructed by our children and students. The making of narratives of identities is full of limitations and possibilities. This process of telling our own stories about who we are is actively and passively constructed in schools and it involves all partners in education. In the science classroom we send messages regarding what counts as scientific knowledge, what kinds of interactions are appropriate among students, and what kinds of relationships we want to foster with knowledge. These are all contexts where we need to examine our complicity in the process of shaping identities that are marginal to science and ask: What is the place of science in the *fronteras*/borders of gender, age, ethnicity, race, class, nationality, sexuality, where girls find themselves locked? How does school science contribute to etch in stone the prescribed stories of identities? How can school science contribute to liberate us from social norms and expand our individual possibilities?

The presence of Mexican girls' voices in discourses about science education enlightened my understanding of the ways science makes sense to them, not only as members of a specific gender and cultural group, but also as students, daughters and adolescents. Their multiple identities are not disassociated in their lived experiences as fragmented categories for analysis. My hope is that their views and their accounts of experience will help us formulate constructive critiques of the discourses of science education, and reform efforts in science to create discourses of identities that challenge, rather than reinforce racist and sexist ideologies of domination.

Developing Relationships with Knowledge

Current debates about science knowledge in science education are particularly concerned with the endorsement of constructivist theories of knowledge to inform learning and teaching science. As Dorit Maor and Peter Taylor (1995) assert,

Constructivism has emerged as a radical alternative to the transmission epistemology of traditional science teaching that conceives of knowledge as being out there in the world and available for transfer to the learner. (p. 843).

One of the major consequences of the radical change from transmissionist to constructivist epistemologies is the role of the learner. Teaching and learning informed by a constructivist epistemology assumes that learners are actively involved in the construction of meaning and connect their new experiences to their prior knowledge and past experiences (*ibid.*).

The current trend towards constructivism is reflected in the textbook series that was used in the Cedarville district. To illustrate the assumption that learners must take an active role in the science classroom, let us take a brief look at an excerpt from the introductory pages, where you can find a message to the student:

The authors of this book want **you to get involved** in science. The activities in this book will allow you to make some basic and important scientific discoveries on your own. You will be acting much like the early investigators in science who, without expensive or complicated equipment, contributed so much to our knowledge. (Science Plus, p. x)

The narratives constructed in our conversations and interviews revealed the qualities of relationships with scientific knowledge which the participants were establishing in schools. Most participants talked about their relationships with science in school contexts in using the symbol of grades and the trade value they assigned to their participation in science. This research finding raises the issue that even though students might claim some level of connection with science, their relationships with knowledge of science can be quite problematic, especially in classrooms founded on constructivist premises.

This finding hints at a deeper exploration of social issues in relation to the epistemological concerns that occupy much of our attention in science education. For example, it is necessary to examine the reasons why students value scientific knowledge, and their motivations to "get involved" in science. The participants in this study revealed a diverse number of reasons to engage in science, including the trade value of science, its personal benefit as a potential career, or its impact on the collective purposes of Mexican people committed to change the image of uneducated. The participants' narratives call for an examination of the ways the institution of schooling reinforces relationships with knowledge that emphasize its trade value, rather than the construction of relationships that empower students to reflect upon their identities, their histories, and their cultural values to connect with subject matter. Engagement in science, as these narratives suggest, is tightly connected to individual and collective purposes of schooling, and the agenda of crafting identities in schools.

Our epistemological assumptions are embedded in a social context which needs to be examined in order to enact the vision of engagement we expect in constructivist classrooms. Critical educational theorists, for example, have addressed and documented the ways knowledge is used in schools to reproduce social inequalities (Freire, 1970; Willis; 1977; Apple, 1979; Anyon, 1981). The implication that learners are active participants in the construction of their own understanding needs to be analyzed in light of the relationships that families, schools, students, and teachers sustain with knowledge. It is

imperative to ask what social conditions need to change in schools in order to endorse a constructivist view of knowledge. We need to address gender, class, race and ethnic struggles as living school conditions that impact the construction of meaning. Finally, advocates of constructivism need to ask if we are falsely presupposing that all students have an equal stance in the realm of meaning making, even when they lack equivalence in the realm of material resources, (McLaren, 1995), social status and self perceptions.

The narratives in this study revealed the need to ask how students relate to knowledge and address the issue of transforming these relationships before we presume their role of active engagement in the process of knowledge construction. One recommendation stemming from this study is that teachers engage in conversations with students to gain a better understanding of their relationships with knowledge, and also to make an impact on the quality of their connections to science. The kinds of conversations that occurred in our small group, for example, impacted the ways Magda connected her history and her experiences in Mexico to her experiences in the science classroom. Likewise, our conversations with Marisa directed her to give meaning and articulate the purposes of science experiments.

Professional, personal, political commitments

This study grew from the feminist premise of placing girls and women at the center of research studies. One of the major intentions of this study was to examine science in the lives of girls of Mexican origin. Rather than focusing on personal attributes or deficiencies of people belonging to the category of women or minority groups, this dissertation focused on the ways these girls construct their identities in the context of schools. This inquiry led to an analysis of social structural constraints and the exploration of possibilities towards the goal of social change. Guided by feminist approaches that go beyond the goal of taking a look at gender as a category of analysis to understand girls' resistance, or their reproductive responses to schooling (Weiler, 1988), in this study I examined interlocking oppressive

forces which reinstate marginality and re-inforce traditional roles for women of minority background in school science.

The markers of gender and ethnicity in these girls' narratives drew my attention to the climate of hostility across the three middle schools and the two high schools they attended. One would expect this climate of hostility to extend to science classrooms. As a science teacher, I remember that the kinds of encounters described in stories like Victoria's narratives about her interactions with other students in the science classroom represented a nuisance. They robbed time from students who were engaged in learning and drove attention away from matters that counted to me, like learning the content of science. A few years back I would not have realized that power struggles like the ones taking place in these girls' lives pertained not only to my obligations as a teacher, but specifically to my teaching of science. Today I would hesitate to affirm that I know what is the correct response to such confrontations where identities are at stake; however, I now understand my complicity in the political struggles that take place in science class and consider myself an active participant in this struggle to construct positive self and group identities. I am more aware of the impact of the forces of racism and sexism that inform my relationships with students and students' relations with each other.

The narratives in this dissertation tell us that we can no longer continue our agendas as researchers, administrators, or teachers without confronting the issues so poignantly presented in these girls' stories. Together, these girls appeal to authority figures in schools to recognize that their identities are being shaped in educational institutions where people can no longer respond to their struggles as mere disciplinary problems in need of punitive actions. Instead of asking for color blind educators, researchers and teachers, these girls call for reflective practitioners who assume responsibility to learn about students' identities and become involved in the process of creating them anew, against the grain of racist and sexist forces that shape stereotypical images of Mexican girls.

EPILOGUE

As I gathered my thoughts to conclude this dissertation I recalled *Dia de la Mujer/Woman's Day*, a conference that met for the first time in Cedarville, just about a year after our last conversation meeting.

Dinner was served at the closing ceremony in an ample space occupied by generous round tables adorned with white table clothes, glowing glasses and china. As I entered the room I saw Alejandra's mother waving her arm, drawing me towards her table where they had reserved room for me. The ambiance was warm, at once busy and friendly. The bass sound of a guitar accompanying a woman's deep voice marked a slow pace, while the crowd moved around looking for empty seats.

"*Y volver volver, volver...quiero volver, volver, volver...*"¹ the lyrics said, while I scanned the room looking for familiar faces. I saw Dominic at the other end of the room surrounded by her mother, her sister and grandmother. From my spot I recognized Magda, seated with a group of teenagers, perhaps her new classmates at the high school. Something about their hair style and demeanor marked the passage of time. I wanted to find where they have been and who they are becoming. I was reminded once more that these girls have transformed me in the most meaningful ways.

I joined the woman singer in the chorus line with my loudest and deepest voice, the one I use to sing *rancheras*, the one that breaks the canons of classical singing style and feels like you want to tear the bottom of your throat as your heart pours out with each word. I entered the room looking forward to connect again, to go back to my conversations with Alejandra, Dominic and Magda. I sat by Alejandra and I began to ask about her school life. She told me of her disappointment having followed her counselors advice of taking an easier course in science to get good grades, rather than the more challenging courses she wanted. We discussed the reasons why the course seemed to easy for her and if it would be advisable to seek another placement.

As we talked, Alejandra's mother, sitting across the table passed around a conference evaluation form. Expecting a traditional array of alternatives, I was ready to check the typical "Hispanic" box, when I realized the multiple choices I was being offered: Chicana/o; Hispanic; Latina/o; Mexican; Puerto Rican; Mexican-American; Other. Unlike more familiar census forms, this one had numerous qualifiers to identify ethnic identity. In spite of this diversity, however, I did not find an adequate box for me. I made a comment to the rest of the women sitting at our dinner table: "I don't know how to answer these questionnaires, I was not made to fit in a box." Alejandra's mother replied promptly: "Mark all of them, if that's what you feel you are." Another woman lifted her head and looked at me with a puzzled expression: "Make one up and write it down there."

¹ In English the lyrics translate into: And to return, return, return...I want to return, return, return.

Today, I was challenged one more time to construct my own identity, to create, rather than accommodate to fit in a box. For me perhaps the most direct and poignant realization coming out of my work with the "young ladies" who participated in this study was to know that as one shapes the identities of a participant in a dissertation project, or a student in a classroom, ones' own identity becomes inevitably transformed in totally unexpected ways.

As I recall *Dia de la Mujer*, the messages of preservation and transformation of cultural heritage strike in my ears urging me to go back in time to ask the participants in this dissertation how we can transform identities against the messages emphasized throughout the conference, and highlighted in Mrs. Guerrero's keynote speech. In this setting where Hispanic, Latinas, Puerto Ricans, and Other women across ages met, Mrs. Guerrero addressed her young audience, the high school young ladies like Alejandra, Dominic, and Magda to remind them of their need to resist a loss of their cultural traditions, and at once embrace the opportunity of getting an education in the U.S.:

You should never put down people by what they eat and what they wear. And how they speak. And if they have an accent. You know what Ricardo Montalván says, "He or she who has an accent knows another language." Glorify your accent and don't be ashamed of your parents. I learned to dance with my father the mazurkas, the polkas, the pasodobles, las rumbas, the danzones, and they called me culturally deprived. *Partida de mensos*.

My father used to say, "*Mijita*, learn English, you are in the United States. Learn English so nobody will step on *mija*. Nobody will step on you. But learn Spanish too so that the *Mejicano* won't step on you either. Your raza. See, and he was already raising me bilingual before I went to kindergarten.

Some people don't understand that they really need to get an education. With an education they can open worlds for anything. That's the one thing no one can take away from you, your education. Your culture, your wisdom, your memories. No one can take away.

Mrs. Guerrero's words struck me as reminders of the contradictions entailed in the job of teaching within an educational system that erases the kinds of cultural traditions honored in Mrs. Guerrero's artistic celebration of creeds, ethnic origins, and languages through a combination of dance and speech.

Mrs. Guerrero's words do not speak solely to an audience of "young ladies." I have chosen her words to close this study because they remind me of our responsibilities towards those in need of institutional change in schools where we can make a difference. Her words extend to teachers, parents, administrators, and educators who work at the frontiers where students' histories, class locations, race, and cultural heritage shape the daily life of schooling. It is my hope that with this realization we become aware of the social forces that constraint our possibilities to engage in social change, but it is also my hope to free the powerful feeling for any parent, administrator, researcher, or teacher to become an active and conscious participant in the process of crafting identities anew.

APPENDICES

APPENDIX A

APPENDIX A

Interview Protocols

Interview # 1

NAME	AGE	PLACE OF BIRTH
HOBBIES	FAVORITE MOVIES MUSIC FOODS	LANGUAGES
SCHOOL (Middle School)	SCHOOL (High School)	GRADE (1993-1994)
PHONE NUMBER	ADRESS	

LANGUAGES
WHICH LANGUAGES DO YOU SPEAK?
WHEN DO YOU USE EACH LANGUAGE?
HOW DO YOU COMMUNICATE BEST WITH PARENTS?

HOW DO YOU COMMUNICATE BEST WITH FRIENDS?

HOBBIES _____

MUSIC _____

MOVIES _____

FOOD _____

FAMILY

NAME	PLACE OF BIRTH	LANG.	GR.	AGE	OCCUPATION /SALARY
MOTHER					
FATHER					
SISTERS					

BROTHERS					
OTHER PEOPLE LIVING AT HOME					

SCHOOL

NAME	LOCATION	
NUMBER OF STUDENTS	CLASS SIZE	ETHNIC/RACIAL COMPOSITION
PRIVATE /PUBLIC	GPA	SCHOOL RATING A-D
COUNSELING SERVICES		
ARE THEY AVAILABLE?	HAVE YOU USED THEM?	HOW?
WHY DO YOU GO TO SCHOOL?		

ON A SCALE OF 1-10 HOW DO YOU RATE THE FOLLOWING SCHOOL SUBJECTS (1 BEING THE LOWEST AND 10 THE HIGHEST):

- PHYSICAL EDUCATION
- SOCIAL STUDIES
- LANGUAGE ARTS
- MATHEMATICS
- SCIENCE
- EARTH SCIENCE
- LIFE SCIENCE
- PHYSICAL SCIENCE
- ART
- MUSIC
- DANCE

PARTICIPATION IN SCIENCE

SCIENCE COURSES	
COURSES TAKEN (ELE & MS)	COURSES OFFERED (ELE & MS)
COURSES TAKEN (HS)	COURSES OFFERED (HS)
GRADES 92-93 Before 92	LABS. HANDS-ON
SCIENCE TEACHERS ELEM	SCIENCE TEACHERS (MS, HS)
FAVORITE TEACHER	ETHNIC BACKGROUND RACE SCIENCE BACKGROUND OTHER DESCRIPTIONS

SCIENCE PROGRAMS (SUMMER AND/OR AFTER SCHOOL
HAVE YOU PARTICIPATED?
HAVE YOU HEARD ABOUT THEM?
WOULD YOU LIKE TO PARTICIPATE IN THEM?
WHAT DO YOU NEED TO PARTICIPATE?
SCIENCE FAIRS
HAVE YOU PARTICIPATED?
HAVE YOU HEARD ABOUT THEM?
WOULD YOU LIKE TO PARTICIPATE IN THEM?
WHAT DO YOU NEED TO PARTICIPATE?

Interview # 2

I. Description

Tell me about your best friends. Who are they?

Why did you choose them? Why do you hang out with them?

How are they different or similar to people who are not your friends?

When I write this book I want to tell people who you are. What do you want me to say about you?

What do you want to be in the future? PROBE: Lifestyle, High school and college plans

How do you think these people say about you when they are describing you to someone else?

-teachers

- a friend

-parents

-science teacher

-a sibling

-a classmate

What words do people use to praise you?

What words do people use to hurt your feelings?

What name do people use to talk about your background:

☐Hispanic ☐Chicana ☐Latina ☐Mexican American ☐ Other

Do you feel like your traditions, customs, values and beliefs are more like Mexican or American.

What do these names mean to you?

Which one of these names do you use and prefer to describe yourself. Why?

Are you a girl or a woman?

When does one become a woman?

As a chicana, what do you want to be when you grow up?

What opportunities are open to you because you are a woman? A Mexican?

What opportunities are not available to you because you are a woman? A Mexican?

Here are something people say about Chicanos. Do you agree with these statements?

- ☐ Chicanos are at risk
- ☐ Chicanos drop out of school more often than white and black students
- ☐ Chicanos have a beautiful culture
- ☐ Chicanos speak spanish
- ☐ Chicanos do not value education
- ☐ Very few chicanos go to college
- ☐ Chicanos are not well served by schools

II. Scientists

How would you describe/draw a scientist?

What do scientists do?

Here are some things people say about scientists. Check if you agree:

- ☐ Scientists are male
- ☐ Scientists can be male or female
- ☐ Scientists are crazy
- ☐ Scientists are creative
- ☐ Scientists are always right
- ☐ Scientists use a method to do their work

What methods do scientists use to do their work?

Do you know any scientists?

Have you thought about becoming a scientist in the future?

How would you prepare yourself to become a scientist?

- skills, attitudes, dispositions
- material resources
- intellectual resources
- school work

III. Science

Here are some things people say about science.

Check if you agree

☐ Science is boring	always	sometimes	most of the time
☐ Science is fun	always	sometimes	most of the time
☐ Science is difficult	always	sometimes	most of the time
☐ Science is for boys only	always	sometimes	most of the time
☐ Girls and boys are good at science	always	sometimes	most of the time
☐ Science is defined by men	always	sometimes	most of the time
☐ Science is for smart people	always	sometimes	most of the time
☐ Science is changing	always	sometimes	most of the time

Let's browse through your science book. Do you feel this book talks about you? In what ways?

Let's think about your past experiences in science courses. What moments do you remember as joyful or discouraging in any of your science courses.

What are some important ideas you've learned in science that you remember because they made a difference to you.

What are some ideas that you really did not find useful or related to your life.

What were some of the most important ideas you learned in science this year?

On a scale of 1 to 10, how important do you rate learning science?

Why do you learn science?

What are your plans for the future?

Do you think that science will in any way help you meet your goals?

What makes science different from any other subject?

In science class you talked:

always sometimes most of the time never

In science class you asked questions

always sometimes most of the time never

In science class you answered teacher questions

always sometimes most of the time never

In science class you gave your opinions

always sometimes most of the time never

During science experiments and hands-on activities you participate

always sometimes most of the time never

How would you describe your participation in science class?

Do you feel comfortable when you talk during science class?

Do you feel that you could participate more, but your not putting in your best? Why?

On a scale of 1-10 how would you rate your

participation in science
interest in science
ability to do well in science
ability to understand science

Compared to other subjects, where does science stand in terms of its use to you personally, your interest in the subject, your ability to do well and understand it.

What makes a student good in science?

What makes a good science course?

Check the topics you found in your science courses

☐ your body	☐ feelings
☐ creativity	☐ sex
☐ emotions	☐ health
☐ sex	☐ Creation
☐ AIDS	☐ the Universe
☐ Religion	☐ History
☐ Women	☐ Hispanics/Latinos
☐ molecules	☐ energy
☐ space	☐ matter

If you had the chance to change the way science is taught what would you do? What do you like and/or dislike about science?

Mark with * the topics you think should be included in your science courses, but are not a part of them.

Many people talk about scientific knowledge as a set of finished results. Do you agree?

Some people say that science is male defined. What do you think they mean by this.

Do you believe that science should be taught differently to people of different racial/ethnic backgrounds?

APPENDIX B

APPENDIX B

Letters to Parents

Mayo 29 de 1993

Estimados Padres ó Guardianes:

Mi nombre es Constanza Hazelwood, soy una estudiante Hispana y curso estudios en el departamento de Educación en la Michigan State University. Me dirijo a ustedes para solicitar su colaboración en un estudio sobre las experiencias de las estudiantes Latinas en la escuela.

Tengo mucho interés en contribuir al mejoramiento de la enseñanza de las Ciencias, y en especial por aumentar la participación de las mujeres Hispanas en las Ciencias. Pienso que la escuela debe hacer mucho para que las niñas aprendan más sobre las Ciencias, pues estos conocimientos son muy importantes para la vida y para aumentar sus oportunidades de estudio y empleo en el futuro. Creo que debemos preguntarle a las niñas Hispanas qué piensan sobre sus cursos de Ciencias, cómo se podrían mejorar y qué les gustaría aprender.

Durante este verano me gustaría planear un encuentro de 1 a 2 horas con su hija sola o en compañía de algún familiar. Estas reuniones podrían hacerse en [Local] Community Center, en la [Local] University, en algún lugar con buena comida como [Restaurant]; si gustan también yo podría visitarlos en su casa.

Sería muy interesante para mi poder conversar con su hija sobre sus experiencias en los cursos de Ciencias y sus sugerencias para hacerlos más interesantes. También me interesa escuchar las opiniones de otro miembro de la familia, si es posible de la madre. Su colaboración es muy importante y sus ideas serán muy bien recibidas. Si desean más información pueden llamarme al [].

Por favor completen el formulario indicando si su hija tiene interés en participar sola o acompañada por algún familiar. El formulario deben enviarlo a:

[]

Muchísimas gracias!

Atentamente,

CONSTANZA HAZELWOOD

FORMULARIO

Por favor marque con una X:

_____ Mi hija está interesada en colaborar

_____ Otro miembro de la familia desea colaborar

_____ En este momento estamos indecisos, pero nos gustaría recibir más información

_____ No estamos interesados

Indique el lugar donde preferiría reunirse con Ms. Hazelwood
(En caso de necesidad, Ms. Hazelwood proporcionará el transporte)

_____ [Local] Community Center

_____ [Local] University

_____ Mi casa

_____ [Restaurante]

_____ Otro _____

Por favor complete los siguientes espacios para facilitar nuestro contacto durante el verano:

Nombre (alumna) _____

Escuela _____

Edad _____ Grado (anotar el que está cursando ahora) _____

Nombre de los padres o guardianes _____

Dirección _____

Teléfono: _____

FAVOR REGRESAR ESTE FORMULARIO ANTES DE JUNIO 10 A

May 29, 1993

Dear Parent or Guardian,

My name is Constanza Hazelwood. I am a Hispanic student in Education at Michigan State University. I am writing to ask your support in conducting a study about Latina's experiences in school.

I have a strong interest in improving the quality of science education and increasing the participation of Hispanic women in science. I believe that schools must do a better job to get girls involved in learning about Science, so they have more opportunities for future career choices and employment.

I believe that we need to ask girls what they think about science courses, how they think science courses can be improved and what they would like to learn if they could change the way science is taught.

I am asking you to volunteer to meet with me twice during the summer for 1 to 2 hours at your convenience. I am considering different places for our meetings: [Local] Community Center, [Local] University, we could meet at a place where there is good food like [Restaurant], or if you prefer, we could meet at your home.

I really hope you will consider volunteering to talk with me. I am sure that you and your daughter have very important things to say about improving science education. It would be very interesting to have a conversation with your daughter about her experiences in science and her suggestions to improve science courses. I would also like to hear the opinions of a second member of the family, especially mothers, if at all possible.

Please fill out the form attached if your daughter is interested in participating and return it to the following address:

[]

If you want more information or have questions, please call me at []. Indicate if any other member of the family would like to be part of our conversation. I truly appreciate your time and your contributions to this study.

Sincerely,

CONSTANZA HAZELWOOD

FORM

PLEASE MARK WITH AN (X):

- ☐ My daughter is interested in participating
- ☐ Other member of the family is interested
- ☐ We might be interested, but we have some questions
- ☐ We are not interested

PLEASE MARK WITH AN (X) THE PLACE WHERE YOU PREFER TO MEET
(IF NECESSARY, MS. HAZELWOOD WILL PROVIDE TRANSPORTATION)

- ☐ Local Community Center
- ☐ Local University
- ☐ Student's home
- ☐ Restaurant
- ☐ Other _____

FILL OUT THE FOLLOWING BLANKS TO CONTACT YOU DURING SUMMER:

Student's name _____

School _____

Age _____ Grade (1992-1993) _____

Parents'/Guardians' Names _____

Address _____

Telephone _____

LIST OF REFERENCES

LIST OF REFERENCES

- American Association for the Advancement of Science. (1989). Project 2061: Science for all Americans. Washington, DC: American Association for the Advancement of Science.
- The American Association of University Women Educational Foundation. (1992). The AAUW report: How schools shortchange girls. Washington, DC: The AAUW Educational Foundation and National Educational Association.
- The American Association of University Women Educational Foundation. (1993). Hostile hallways: The AAUW survey on sexual harassment in America's schools. Washington, DC: American Association of University Women.
- Andersen, M.L. & Collins, P.H. (1995). Race, class, and gender: An anthology. Belmont, CA: Wadsworth Publishing Company.
- Anyon, J. (1981). Social class and school knowledge. Curriculum Inquiry, 11, 3-41.
- Anzaldúa, G. (1990). Haciendo caras, una entrada. In G. Anzaldúa (Eds.), Making face, making soul (pp. xv-xviii). San Francisco: Aunt Lute Foundation Book.
- Aponte, R., & Siles, M. (1994). Latinos in the heartland: The browning of the midwest (Research Report No. 5). East Lansing, MI: Michigan State University, Julián Samora Research Institute.
- Apple, M. (1979). Ideology and Curriculum. Boston & London: Routledge & Kegan Paul.
- Barton, A. (1995). Our lives are our theories are our lives. Ph.D. Dissertation. Michigan State University.
- Baca Zinn, M, & Dill, B.T. (Eds.). (1994). Women of color in U.S. society. Philadelphia: Temple University Press.
- Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. M. (1986). Women's ways of knowing: the development of self, voice and mind. New York: Basic Books, Inc., Publishers.

- Bezzi, A. (1996). Use of repertory grids in facilitating knowledge construction and reconstruction in geology. Journal of Research in Science Teaching, 33 (2), 179-204.
- Biklen, S. K., & Pollard, D. (1993). Sex, gender, feminism, and education. In S. K. Biklen & D. Pollard (Eds.), Ninety-second yearbook of the National Society for the Study of Education (pp. 1-11). Chicago, Illinois: The National Society for the Study of Education.
- Bowles, S., & Gintis, H. (1976). Schooling in capitalist America. New York: Basic Books.
- Britzman, D. (1991). Practice makes practice: A critical study of learning to teach. Albany, N.Y.: State University of New York Press.
- Brooks, J. G., & Brooks, M. G. (1993). In search of understanding: the case for constructivist classrooms. Alexandria, VA: Association for Supervision and Curriculum Development.
- Brown, C. (1992). Al Norte. Cedarville State Journal, p. 1C.
- Carter, K. (1993). The place of story in the study of teaching and teacher education. Educational Researcher, 22(1), 5-12.
- Casey, K. (1995-96). The new narrative research in education. In M. Apple (Eds.), Review of research in education (pp. 211-253). Washington DC: American Educational Research Association.
- Cavazos, L. (1994) A search for missing voices. Ph.D. Dissertation. Michigan State University.
- Chapa, E., & Gutierrez, A. (1977). Chicanas in politics: An overview and a case study. Paper presented at the Third Annual Meeting of the National Association of Chicano Social Science. In R. F. Macias (Eds.), Perspectivas en Chicano studies (pp. 137-156). Los Angeles: Chicano Studies Center Publications-UCLA.
- Cisneros, S. (1989). The house on mango street. New York: Vintage Books.
- Cochran--Smith, M. (1995). Color blindness and basket making are not the answers: Confronting the dilemmas of race, culture, and language diversity in teacher education. American Educational Research Journal, 32(3), 493-522.

Collins, P.H. (1990). Black feminist thought: knowledge, consciousness and the politics of empowerment. Cambridge: Harper Collins Publishers.

Collins, P.H. (1994). Foreword. In M.Baca Zinn & B.T. Dill (Eds.), Women of color in U.S. society (pp. xii-xv). Philadelphia: Temple University Press.

Connelly, M., & Clandinin, J. (1990). Stories of experience and narrative inquiry. Educational Researcher, 19 (5): 2-14.

Cooper, J. (1991). Telling our own stories: The reading and writing of journals or diaries. In C. Witherell.& N. Noddings (Eds.), Stories lives tell: narrative and dialogue in education. (pp. 96-112). New York: Teachers College Press.

Cortazzi, M. (1993). Narrative analysis. London and Washington, DC: The Falmer Press.

Coulthard, M. (1977). An introduction to discourse analysis. New York: Longman, Inc.

de la Torre, A., & Pesquera, B. M. (1993). Building with our hands: New directions in Chicana studies. Berkeley, Los Angeles & London: University of California Press.

Dewey, J. (1916). Democracy and education. New York: The Free Press.

Freire, P. (1970). Pedagogia do Oprimido. Rio de Janeiro: Editora Paz E Terra.

Freire, P., & Macedo, D. P. (1995). A dialogue: Culture, language and race. Harvard Educational Review, 65(3), 377-402.

Gale, J. (Unpublished). Personal communication. Narrative-List. (November, 1995).

Gaskell, J. (1985). Course enrollment in the high school: The perspective of working class females. Sociology of Education, 58(1), 48-59.

Gaskell, J. (1992). Gender matters from school to work. Bristol, PA: Open University Press.

Gee, P. J., Michaels, S., & O'Connor, M. C. (1992). Discourse analysis. In The handbook of qualitative research in education (pp. 227-291). San Diego, CA: Academic Press.

- Gilligan, C. (1989). Prologue. In C. Gilligan, N.P. Lyons, & T.J. Hammer (Eds.), Making connections: The relational worlds of adolescent girls at Emma Willard School (pp. 1-5). Cambridge & London: Harvard University Press.
- Giroux, H. (1981). Ideology, culture, and the process of schooling. Philadelphia: Temple University Press.
- Giroux, H. (1992). Border crossings. cultural workers and the politics of education. New York: Routledge, Chapman and Hall.
- Greene, M. (1993). Gender, multiplicity, and voice. In S. K. Biklen & D. Pollard (Eds.), Gender and education: Ninety-second yearbook of the National Society for the Study of Education (pp.241-255). Chicago, Illinois: The Nations Society for the Study of Education.
- Griffin, S. (1993). A chorus of stones. New York: Anchor Books Double Day.
- Grumet, M. (1988). Bitter milk: Women and Teaching. Amherst: University of Massachusetts Press.
- Haney, J. (1979). Chicanos of Michigan. In H. C. Hawkins & R. W. Thomas (Eds.), Blacks and Chicanos in urban Michigan (pp. 17-19). Michigan Department of State.
- Harding, S. (1986). The science question in feminism. Ithaca: Cornell University Press.
- Harding, S. (1991). Whose science? Whose knowledge? Thinking from women's lives. Ithaca, NY: Cornell University Press.
- Hartsock, N. (1983). The feminist standpoint: developing the ground for a specifically feminist historical materialism. In S. Harding & M. Hintikka (Eds.), Discovering Reality (pp. 283-312). Dordrecht: Reidel.
- Hopkins, R. (1994). Narrative schooling: Experiential learning and the transformation of American education. New York: Teachers College Press.
- Hazelwood, C. (Unpublished). Latinas' participation in school science. Ph. D. Dissertation Proposal.
- Hollingsworth, S. (1994). The problem of gender in teacher education. Paper presented at the Midwestern Educational Reasearch Association, Chicago, Ill.

- hooks, b. (1989). Talking back. Thinking feminist. thinking black. Boston, MA: South End Press.
- hooks, b. (1994). Teaching to transgress: Education as the practice of freedom. New York: Routledge.
- Hurd, P. (Unpublished). Personal communication. San Francisco, CA. (April, 1992).
- Hurtado, A., González, R., & Vega, L. A. (1994). Social identification and the academic achievement of chicano students. In A. Hurtado & E. E. García (Eds.), The educational achievement of Latinos: Barriers and successes. University of California.
- Hurtado, A., Rodríguez, J., Gurin, P., & Beals, J.L. (1993). The impact of Mexican descendants' social identity on the ethnic socialization of children. In M.E. Bernal & G.P. Knight (Eds.), Ethnic identity (pp. 131-162). Albany, NY: State University of New York Press.
- Hurtado, A., & Gurin, P. (1987). Ethnic identity and bilingualism attitudes. Hispanic Journal of Behavioral Sciences, 9(1), 1-18.
- Jones, L. R., Mullis, I., Raizen, S. A., Weiss, I. R., & Weston, E. A. (1990). The 1990 science report card. Washington, DC: U.S. Department of Education.
- Kahle, J. B. (1994). Interrelationships between gender, affect, and retention in science classrooms: A theoretical approach. In M. M. Atwater, K. Radzik-Marsh, & M. Strutchens (Eds.), Multicultural education: Inclusion of all (pp. 135-150). Athens, GA: The University of Georgia.
- Kelly, A. (1985). The Construction of Masculine Science. British Journal of Sociology of Education, 6(2), 133-153.
- Lambourne, K., & Baca Zinn, M. (1993). Education, race and family: issues for the 1990s (Working Paper No. 16). East Lansing, MI: Michigan State University, Julián Samora Research Institute.
- LeCompte, M. D. (1993). A framework for hearing silence: What does telling stories mean when we are supposed to be doing science? In D. McLaughlin & W. G. Tierney (Eds.), Naming silenced lives: Personal narratives and processes of educational change (pp. 2-28). New York and London: Routledge.
- Lemke, J. (1990). Talking science. Norwood, NJ: Ablex Publishing Corporation.

- Lincoln, Y. S. (1993). I and thou: Method, voice, and roles in research with the silenced. In D. McLaughlin & W. G. Tierney (Eds.), Naming silenced lives: Personal narratives and processes of educational change (pp. 2-47). New York and London: Routledge.
- Linn, M., & Hyde, J. (1989). Gender, mathematics, and science. Educational Researcher, 18, 17-27.
- Lugones, M. (1990). Hablando cara a cara/Speaking face to face: An Exploration of ethnocentric racism. In G. Anzaldúa (Eds.), Making face, making soul (pp. 46-54). San Francisco, CA: An Aunt Lute Foundation Book.
- Lugones, M. (1994). Purity, impurity and separation. Signs, Winter, 458-479.
- Luke, C. (1992). Feminist politics and radical pedagogy. In C. Luke & J. Gore (Eds.), Feminisms and Critical Pedagogy (pp. 25-53). New York: Routledge.
- Luke, C. & Gore, J. (1992). Introduction. In C. Luke & J. Gore (Eds.), Feminisms and critical pedagogy (pp.1-14). New York & London: Routledge.
- Maher, F. A., & Tetrault, M. K. (1993). Doing feminist ethnography: Lessons from feminist classrooms. Qualitative Studies in Education, 6(1), 19-32.
- Maher, F. A., & Tetrault, M. K. (1994). The feminist classroom. New York: Basic Books.
- Maor, D., & Taylor, P. C. (1995). Teacher epistemology and scientific inquiry in computerized classroom environments. Journal of Research in Science Teaching, 32(8), 839-854.
- Mc-Elroy-Johnson, B. (1993). Giving voice to the voiceless. Harvard Educational Review, 63, 85-104.
- Mccoby, E., & Jacklin, C. (1974). The psychology of sex differences. Stanford, CA: Stanford University Press.
- McIntosh, P. (1983). Interactive phases of curricular re-vision: A feminist perspective. (Working Paper No. 124). Wellesley College.
- McLaren, P. (1989). Life in schools: An introduction to critical pedagogy in the Foundations of Education. White Plains, NY: Longman.

- McLaren, P. (1995). Defining empowerment? Imposing change? Paradoxes and limitations in practicing critical ethnographic research in education. Paper Presented at the Annual Meeting of the American Educational Research Association. San Francisco, CA.
- McLaughlin, D., & Tierney, W. G. (1993). Naming silenced lives: Personal narratives and the process of educational change. New York & London: Routledge.
- Michigan Department of Education. (1991). Michigan essential goals and objectives for science education (K-12). Lansing, MI: The Michigan State Board of Education.
- Morrison, E. S., Moore, A., Armour, N., Hammond, A., Haysom, J., Nicoll, E., & Smyth, M. (1993). Science plus: Technology and society. Austin, Orlando, San Diego, Chicago, Dallas, Toronto: Holt, Rinehart and Winston.
- Muñoz, V. (1995). "Where something catches:" Work, love and identity in youth. Albany, NY: State University of New York
- National Education Goals Panel (1995). 1995 National education goals report: Building a nation of learners. Washington DC: U.S. Government Printing Office.
- Navarro, J.J. (1992). Will teachers say what we want to hear? Dilemmas on teacher voice (Research Report 92-5). East Lansing, MI: Michigan State University, National Center for Research on Teacher Learning.
- Nieto, S. (1992). Affirming diversity. The sociopolitical context of multicultural education. White Plains, NY: Longman.
- Nieto, S. (1977).
- Nieto, S. (1994). Lessons from students on creating a chance to dream. Harvard Educational Review, 64, 392-426.
- Noddings, N. (1984).
- Ogbu, J. (1987). Variability in minority school performance: A problem in search of an explanation. Anthropology and Education Quarterly, 18, 312-334.
- Parker, L., Rennie, L., & Harding, J. (1995). Gender Equity. In B. J. Fraser & H. J. Walberg (Eds.), Improving science education (pp. 186-210). Chicago, Ill: University of Chicago Press.

- Pérez, L. E. (1993). Opposition and the education of Chicana/os. In C. McCarthy & W. Crichlow (Eds.), Race identity and representation in education (pp. 268-279). New York & London: Routledge.
- Pesquera, B.M., & Segura, D.A. (1993). There is no going back: Chicanas and feminism. In N. Alarcón, R. Castro, E. Pérez, B. Pesquera, A. Sosa Riddell, & P. Zavella (Eds.), Chicana critical issues (pp. 95-115). Berkeley: Third Woman Press.
- Rogers, A. (1993). Voice, Play, and a Practice of Ordinary Courage in Girls' and Women's Lives. Harvard Educational Review, 63, 265-295.
- Rosaldo, R. (1993). Culture and truth: The remaking of social analysis. Boston: Beacon Press.
- Rosebery, A.S., Warren, B., & Conant, F.R. (1990). Appropriating scientific discourse: Findings from language minority classrooms. Office of Bilingual Education and Minority Language Affairs. Washington, DC: U.S. Department of Education.
- Rosser, S. V. (1986). Teaching science and health from a feminist perspective. New York: Pergamon Press.
- Rosser, S. V. (1990). Female friendly science. Elmsford, NY: Pergamon Press.
- Rosser, S. V. (1992). Biology and feminism. New York: New York: Twayne Publishers.
- Roth, K. (1995). Stories of connection and alienation: Examining the neighborhood of science from the margins. Paper presented at the Annual Meeting of the American Educational Research Association. San Francisco, CA.
- Roth, K. J. (1985). Food for plants: Teacher's guide (Research Series No. 153). East Lansing, MI: Michigan State University, Institute for Research on Teaching.
- Roychoudhury, A., Tippins, D. J., & Nichols, S. E. (1995). Gender-Inclusive Science Teaching: A Feminist Constructivist Approach. Journal of Research in Science Teaching, 32(9).
- Sacks, H., Schegloff, E., & Jefferson, G. (1972). A Simplest systematics for the organization of turn-taking for conversation. Language, 50(4), 696-735.
- Saldívar, R. (1990). Chicano narrative: The dialectics of difference. Madison, WI: The University of Wisconsin Press.

- Salinas, M. (1993). The scholarship jacket. In T. A. Lopez (Eds.), Growing up Chicana/o (pp. 127-132). New York: Avon Books.
- Samora, J., & Vandel, P. (1993). A history of the Mexican American people. Notre Dame & London: University of Notre Dame Press.
- Siles, M., & Aponte, R. (1995). The education of Hispanics in Michigan: A comparative assessment (Statistical Brief No. No. 4). East Lansing, MI: Michigan State University, The Julian Samora Research Institute.
- Tannen, D. (1989). Talking voices: Repetition, dialogue, and imagery in conversational Discourse. Cambridge: Cambridge University Press.
- Tobin, K. (Ed.). (1987). Gender differences in science: They don't happen here! Perth, Western Australia: Faculty of Education, Curtin University of Technology.
- Tobin, K., & Gallagher, J. (1987). The role of target students in the science classroom. Journal of Research in Science Teaching, 24, 61-75.
- U.S. Bureau of the Census (1980). No.
- U.S. Bureau of the Census (1992). 1990 Census of Population. U.S. Bureau of The Census.
- Valdés, D. (1982). El Pueblo Mexicano en Detroit y Michigan: A social history. Detroit: Wayne State University.
- Valencia, R. (Ed.). (1991). Chicano school failure and success: Research and policy and agendas for the 1990s. London: The Falmer Press.
- Visweswaran, K. (1994). Fictions of feminist ethnography. Minneapolis, MN: University of Minnesota Press.
- Weiler, K. (1988). Women teaching for change. Massachusetts: Bergin & Garvey Publishers.
- Weiler, K. (1992). Introduction. In K. Weiler & C. Mitchell (Eds.), What schools can do: Critical pedagogy and practice (pp. 1-10). Albany, NY: State University of New York Press.

Willis, P. (1977). Learning to labor: How working class kids get working class jobs. New York: Columbia University Press.

Wolfe, A. (1992). Democracy vs. sociology: Boundaries and their political consequences. In M. Lamont & M. Fournier (Eds.), Cultivating differences: Symbolic boundaries and the making of inequality (pp.309-325). Chicago: University of Chicago Press.

Zavella, P. (1994). Reflections on diversity among Chicanas. In S. Gregory & R. Sanjek (Eds.), Race (pp. 199-212). New Brunswick, NJ: Routledge.

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