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The Impact of Social and Cultural Factors on Minority Students' Participation in an International Baccalaureate Diploma Program

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THE IMPACT OF SOCIAL AND CULTURAL FACTORS ON
MINORITY STUDENTS' PARTICIPATION IN AN
INTERNATIONAL BACCALAUREATE
DIPLOMA PROGRAM

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

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College of Natural and Health Sciences
School of Mathematics
Educational Mathematics

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This Dissertation by: Elizabeth Scott-Janda

Entitled: *The Impact of Social and Cultural Factors on Minority Students' Participation in an International Baccalaureate Diploma Program*

has been approved as meeting the requirement for the Degree of Doctor of Philosophy in College of Natural and Health Sciences in the School of Mathematics, Program of Educational Mathematics.

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ABSTRACT

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Although concern about mathematical achievement inequities has become widespread, even in well-funded, high-performing high schools, unequal outcomes for minority and disadvantaged students can seem persistent and difficult to change despite strong efforts. This project reports on an ethnographic study that examined how social environments within schools can affect students' choices of whether or not to attempt advanced coursework in mathematics, especially among marginalized groups like Hispanic minorities, low socio-economic status (SES) and rural populations. It considered how social and peer environments affect students' approaches to schooling, and decisions they make that will have long-term implications for their futures. In particular, it focused on the academic cultures which arise around advanced tracks such as International Baccalaureate (IB) and AP classes, asking if those cultures may draw some students in and leave others out based on whether students can conform to cultural expectations within those peer subcultures. Finally, gender expression and gender norms were considered, especially as they intersect with academic norms and high achieving sub-cultures. This work may help schools to understand their own academic and gender cultures, making it possible for them to influence on-campus environments in order to create the opportunity for greater access to mathematics for all students.

CHAPTER I

INTRODUCTION

One of the important values that public education serves is the American

ideal of a free and just society, in which people of all backgrounds have equal access

to homes, jobs and other resources that contribute to their pursuit of happiness.

Public education has become a primary means by which our country attempts to

address existing inequality and provide opportunities for greater economic security

to all students (Condron, 2009; Haveman & Smeeding, 2006), and it especially

serves as a bridge for immigrants (Noguera, 2004). Many people assume that, with a

public education, disadvantaged students will be able to obtain greater economic

security than their parents and will then in turn educate and care for their own

children as new members of the middle class. In this way, we intend education to

fight poverty, and even more broadly speaking, to lay the foundations for a society

that resists becoming economically stratified, as were the Old World cultures from

which we as a nation broke away (Jeffrey, 1978).

But economic and educational statistics do not show that our current,

education-based system to offer upward mobility is successful, particularly in the

communities most in need: those which are poor, rural, ethnic minority, have low

educational achievement levels among adults, or are not fluent English speakers

(Condron, 2009; Haveman & Smeeding, 2006). On the contrary, as noted by the

National Education Association (NEA, 2015), "Although there are exceptions, students from poor family backgrounds tend to do poorly in school" (para. 5). Indeed, many authors are clear that no other factor makes more difference in a child's academic achievement than socioeconomic status (Brown-Jeffy, 2009; Reardon, 2013; Roscigno, 2000). Lower SES students' educational achievement level (including mathematics and numeracy skills) have lagged behind those of middle-class Americans as long as these differences have been studied, middle-class students' achievement is beginning to fall markedly behind that of their wealthy peers, and both of these gaps are growing rather than shrinking (Reardon, 2013). An effect is that generational poverty does exist, and specific communities of Americans are regularly excluded from participating in the promise of a fair and just society.

The Hispanic community is an example of one in which upward mobility is being complicated by the intersecting factors of minority status, low SES, and poor school achievement. There is troubling evidence of an achievement gap between White and Hispanic students at all academic levels. Hemphill and Vanneman (2011), writing for the National Assessment of Educational Progress (NAEP), find achievement gaps between Hispanic and White fourth-grade students in both mathematics (21 percentage points) and reading (25 points); they also find that these gaps have persisted since at least 1990, and tend to increase as children progress through school, so in eighth grade, for example, the achievement gap in mathematics has grown to 26 points on average. This has a strong, negative impact on Hispanic students' later school success. According to the National Center for Educational Statistics, the overall high school drop-out rate is 6.8 % nationally, but among

Hispanic youth it is 11.8% (Stark & Noel, 2015). White students are still far more likely to enroll in advanced classes in high school than Hispanic students (Crisp & Nora, 2012; Mikelson, Bottia, & Lambert, 2013), more likely to enroll in college (42% of White students compared to 32% of Hispanic students), and more likely to graduate from college with a degree or certificate (41% versus 15%, respectively; Krogstad, 2015). Furthermore, Lindholm-Leary and Borsato (2005) attribute large disparities between Hispanic and White participation in STEM professions to Hispanic students' relative lack of success in K-12 mathematics courses.

Indeed, while all subject areas are important, students' learning of mathematics has been identified as a key factor in school progress and goal achievement. The National Mathematics Advisory Panel, in a 2008 report, underscored the importance of a three-year high school course sequence including algebra I and algebra II as a gateway to later educational and career opportunities. The report stated that completing this course sequence successfully is associated with a 50% decrease in Hispanic student likelihood of dropping out of college. Moreover, the same report offered anecdotal evidence that mathematics is viewed by educators as the greatest hurdle some students face in graduating from high school and transitioning successfully to jobs or programs that are likely to lead to economic stability. Because of this, understanding Hispanics' achievement in mathematics, special challenges that mathematics may pose, and the decisions that lead to undertaking advanced coursework in it, is an important part of studying their school success overall.

Project Description

The study described in this project was initiated by IB (International Baccalaureate) staff at Lakeview High School[1], particularly the IB Program Director and a senior math teacher. At the time Lakeview's mathematics department had recently hosted a separate study on a different topic, and faculty leaders working with the IB program had some exposure to qualitative research methods through their own graduate programs, so they had decided on a specific research question and methodology. They wanted to know why there were so few successful minority students, especially Hispanic students of Mexican and Central American origin, in the IB program at Lakeview. Despite the logistical difficulties of ethnography as a method (especially in terms of time commitment required), they specifically hoped to have their question investigated with an ethnographic study. Because I had begun, and regretfully set aside, a similar ethnographic study at another school, I was happy to be able to take on another ethnography that had a similar focus (although a very different setting and population).

Qualitative research embraces a variety of methods, including case study, phenomenology, ethnography, grounded theory and others. Perhaps unlike the variety of quantitative methods, the choice of a qualitative research method has implications for what the results of a study may be. For example, a phenomenological study would search for answers to Lakeview's diversity question in lived experiences, so might focus on students' impressions and feelings. A case study would collect information about Lakeview's IB program from a selected group of participants and describe common themes that arose, and so would generally describe what students and staff knew about

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[1] The name of the school and all participant names are pseudonyms.

the program (limited by what they were able and willing to express in words), and in particular would focus on themes about which multiple participants were aware and of which they had spoken. Ethnography, however, is quite different. It is intended specifically as a method of investigating cultures and social forces, and its unit of analysis is a given culture-sharing group. Additionally, because ethnography involves extended periods of participant observation as well as in-depth interviews, in some ways it is particularly suited to describe elements of complex settings of which individuals embedded within those settings may not be aware, or only incompletely aware. Following a well-known metaphor, ethnography seeks to describe the "water" in which the "fish" live.[2] Therefore, by asking for an ethnographic study, the staff at Lakeview had in fact added layers of meaning to the research question they posed. They wanted to know what social dynamics, i.e., what cultural conditions at Lakeview, contributed to the lack of diversity that they observed (and school demographic data confirmed) in Lakeview's highest track.

Merriam (2009) explained that ethnography developed from the research methods of anthropologists in the late 19th century. The crucial innovation was the idea of *participant observation*, in which a researcher is embedded in a social setting and takes part in the activities of the group while conducting research. Gall, Gall, and Borg (2003) emphasize that the researcher "establish(es) a meaningful identity within the group; however, … does not engage in activities that are at the core of a group's identity" (p 268). That is, a defining part of ethnographic work is that the researcher becomes part of

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[2] "Like a fish in water" describes the experience of being so unquestioningly part of an environment that we are unaware of it: a fish is not aware of the water around it, and simply accepts the conditions in which it lives.

the community being studied, forming relationships with group members, and is eventually accepted as a regular part of normal activities. This emphasis on relationships and acting as a group member is one of the challenging parts of ethnographic research, because it takes a considerable amount of time.

　　In the specific case of the present study, being a participant observer meant building relationships first with Lakewood's teachers, talking to them about the proposed study, their students, and the IB program, and asking for permission to first just visit a classroom. Once I was visiting a classroom, there was always an extended period (perhaps several weeks) in which my presence was greeted with quizzical looks, the students seemed a bit too aware of my presence, and I could not be certain that conversations and activity occurring near me were natural, and unaffected by my presence. In each class, however, I eventually because a "fixture," an expected part of the setting. Students would say "hi" and smile (or not) as they came in; they learned that I would not interrupt misbehavior that was not life-threatening, and so they ignored me as they browsed internet videos at the back of the room during lessons or roughhoused before their teacher arrived. During class I sat at the back whenever the teacher was speaking, but then circulated when students were working, offering tutoring help while interspersing my visits with social comments or seemingly-random questions: Do you like the video announcements? If so, why don't you pay attention? How did this lesson go for you? What are you listening to on your phone? (Spoken to two girls sharing a set of earbuds.) Do you like math? Why did you take this class? Why are you (or aren't you) in IB? And so on.

Merriam (2009) describes participant observation as a "schizophrenic activity" (p. 126) in which the researcher engages in group activities, but not too much, because they must always be actively observing the scene around them at the same time. Sometimes this can be difficult to balance for researchers, who may tend to be drawn into group activities and relationships, and hence must work to maintain enough detachment to observe and analyze. In my case, it helped that I was neither a teacher nor a student, and in fact I had no official duties. While I frequently offered whatever help I could give to teachers, from passing out materials to "catching up" students who had been absent, to running down the hall to make a few extra copies or retrieve a forgotten item from an office, I had no job description except "volunteer," which was the identifier on the lanyard tag I wore while on campus. Despite an honest desire to contribute as much as I could, I rendered little or no valuable service during the entire year that I was making visits to the school. Instead I took a peripheral role, one that eventually melded into the background and was rarely specifically noticed, and from which it was relatively easy to think more about the dynamics around me than what I was, or should be, doing in my role as general classroom helper.

To a lesser extent, I worked to attain the same kind of immersion in the more public spaces in the school, such as the hallways between classes or the busy plaza out front during lunch, where I also spent time observing. I often moved around between (or occasionally during) classes, watching any special activities such as a science class launching a weather balloon or an algebra class making rubber band catapults, noticing how students grouped themselves and chatted during breaks, watching interactions in an outdoor area where students had been brought to work on an assignment, taking pictures

of displays about student activities, and so on. I helped with or attended a number of school events, chaperoning at prom, for example, proctoring AP tests, going to graduation and graduation rehearsal, dances, and an International Night hosted by the IB program. Here, too, I sought to simply become one of the people that it was unsurprising to see, and eventually felt this had been achieved when the administrators (who always stood out in their dress shirts and slacks) stopped pausing to look for my volunteer badge when they passed me in the hall.

The product of participant observation is sheaves of fieldnotes, written during or immediately after the periods of observation described above, which are perhaps the backbone of ethnographic research. Because the intent of ethnography is to study culture in a specific setting, paying attention to and recording group members' interactions, body language, activities, friendships, and so on, provides the foundation for pattern-making and insight. This is true despite the fact that field notes can never be complete, as Wolcott (2005) explains. The settings observed in ethnography are simply too complex, involving too much activity, to observe everything of importance, and much of what is observed is never put on paper simply because the amount of time required to write detailed accounts. Four hours of observation, for example, take longer than four hours to commit to paper even in a fairly basic form. Thus, all ethnographers retain extensive "head notes" (Ottenberg, 1990, pp. 144-146), which complement, and help direct, the creation of written notes. For example, the observer may see a behavior and recognize that it suggests a pattern which has been playing out but has not been included in fieldnotes yet. Based on unwritten "notes" the behavior is identified as important because it has been repeated, and at this point it may be documented in writing.

The example noted above suggests that at least some of part of the observation process does involve analysis, and the creation of observation notes cannot be separated from the analysis process. In practice it is not desirable to separate the two, as understanding the data better through analysis activities improves the quality of observations and notes. Merriam (2009), for example, emphasizes that "the much preferred [sic] way to analyze data in a qualitative study is to do it simultaneously with data collection," since "without ongoing analysis, the data can be unfocused, repetitious, and overwhelming in the sheer volume of material that needs to be processed. Data that have been analyzed while being collected are both parsimonious and illuminating" (Merriam, 2009, p. 171). However, despite the fact that the processes of collecting data and analyzing data cannot be separated as activities, it is still useful to consider them separately when describing what is actually done, and what the goals of each are. I begin by discussing fieldwork, as this at least momentarily precedes analysis.

The process of observation and making observation notes have been documented as having identifiable stages; one model, due to Spradley (1980), suggests three. The first is a *descriptive* stage, in which "observations tend to be unfocused and general in scope" (Gall et al., 2003, p. 269), and although the notes correctly record activities and behaviors, they may lack depth and insight. For example, in my observations I began making notes about gender fairly early, but, at first, they were very basic. I counted how many girls and boys were in a classroom, for example, and in my notes considered students as part of social groups whose gender mixes I noted and described. But I was also making many more general notes about the layout of the room, the topic of the day's lesson, and the odd norms concerning student lateness at my school site, which often

resulted in a surprising (to me) circulation of coming and going students for the first 15 or so minutes of some classes. Indeed, most of the details that I wrote about in the beginning was not important to the themes I would later choose to include in my papers. However, the stage of thinking that is represented in those descriptive notes is very important. It evolved into a need to understand more about gender dynamics, and slowly helped me to understand that while the movement of students at the beginning of class were unimportant as a reflection of school policy, it was very important as it revealed gender differences in how students were coping with the requirement that they conform to school behavioral standards. By the time I reached these conclusions I better understood the behaviors I was observing, and I had begun to write about what I was seeing in a different way.

The second phase of fieldwork can be thought of as a *focused* stage (Gall et al., 2003). At this point, a researcher has identified at least some features of the culture being studied that appear to be highly significant, and attention becomes focused on collecting deeper information about those features. During my study, when I realized that gender and gender identity were very significant in students' in-class behavior and achievement, my notes became a place where I actively asked questions about gender and recorded details that seemed to hint at answers. There was a stage when I was writing about what girls and boys were wearing, what colors the backpacks were, comparing how boys behaved in geometry versus IB math classes, and wondering whether given behaviors were intended as a display of gender identity (as opposed to being simply the result of excess energy, perhaps). I was tracking what specific boys and girls were doing during class, tallying the genders of the students who arrived in class late (or arrived and

promptly left again), and writing up some scenes about gender as anecdotes or very short narratives. Gender was not the only theme that I felt was important and was tracking closely (race and racism, for example, was another), but I was giving careful attention to it, and the notes I was taking reflected this focus.

The third (and last) phase of observation is a *selected* stage in which the researcher has established the research questions or problems which will be the study's focus, and now works to understand these themes in depth (Gall et al., 2003). Ideally, this phase ends only with the *saturation* of the data, meaning that the patterns of behavior within the study setting feel well understood, new incidents suggest the same meanings as older ones did, and more observation does not result in more learning and insight about the themes selected. When I look at my notes, evidence of being in this final stage appears in the depth (or *thickness*) of the descriptions that I was including. I was uninterested in the colors of the backpacks (which I could guess without looking), but very interested in some of the interactions and events that played out around me. I wrote narratives about conversations I had with students, including exact words when possible, or paragraphs about student interactions that now formed small, complete scenes, or made notes about how some given incident connected with one from another day.

Gall et al. (2003) do not suggest that in this stage interpretation and analysis are an active part of the writing process, but it was in my experience. In writing a précis about a student who walked into a class with an empty water bottle and experimentally bopped his friend over the head with it as he walked past (the sound it made wasn't loud enough to be satisfying, so he immediately did it again, harder), my writing was an expression of a guess that I had already made, an interpretation that I was testing in my

mind. I already believed that some male students, especially minority males whose home communities had clear and strong expectations about how members would enact their masculinity, struggled with school behavior requirements as conflicting with their gender identities. When I wrote the description, I was thinking about the event I had seen in comparison to this theory. Did the boys' facial expressions validate or refute my idea? What did it mean that the second boy, the one who was hit, simply threw up his arms to ward off any subsequent blows? Was it important that the class that was about to begin was taught by a small, blonde woman (who was not yet in the room)? While I didn't necessarily write all of these questions and impressions down, they were certainly in my mind as I put the story on paper, and in attempting to evoke the moment in my description I was in part working to better understand what had happened.

Field notes are not the only sources of data that ethnographers use; rather, virtually any qualitative data source can be included, as can quantitative tools like surveys (Creswell, 2013). In my study, as typical in ethnography, interviews with students and staff were also very important. I collected artifacts extensively as well, mostly in the form of class handouts or photographs (taken on an iPad), which I used in order to record settings, displays (such as a display that illustrated the possible academic pathways that students could choose), student activities, student work (covering any identifying information), and more. From my experience in this project, it seemed that all types of data collection, not just observations, reflected Gall et al.'s three stages. For example, my first interviews were relatively general in that I followed my initial interview protocol fairly closely and my questions were aimed at establishing a number of different reasons why minority students might not choose to participate in IB. Later, as

the study progressed, I asked questions that focused on themes that I felt were emerging and further I actively tried to anticipate what each person could talk about in depth. For example, one Latina student was not able to talk about racial dynamics at the school in much detail because she was comfortable with the school culture around race, but, as it happened, she had taken the geometry class that involved building a house and was happy to describe her experiences with the course. Another student I interviewed was noticeable as the only girl in IB who wore beautifully coordinated outfits, often with high heels and some makeup. When I interviewed her, she was able to tell me her experiences with an IB culture that often demanded that group members give up some forms of gender expression. So, my later interviews covered fewer topics but each gave rich information about a few topics that I had begun to believe were especially important.

Creswell (2013), following Wolcott (1994), suggests a stage model of the analysis of ethnographic data as well, this time starting with *description*, followed by *analysis* and then *interpretation*. From this point of view, analysis begins by producing "thick" (rich, detailed) descriptions of observed settings or interactions, then continues by sorting these descriptions in order to look for patterns or to make comparisons, and finally the researcher makes interpretations based on the data (which Creswell and Wolcott also define as "analysis" because this step involves transforming the data). This model is useful despite the fact that its assertions are somewhat in conflict with Gall et al.'s (2003) stages of observation, as described above. Taking the two together, the implication is that analysis does not begin until the observation stage is advanced enough that the researcher has produced an assortment of rich descriptions, but Gall et al. (2003) assert that there is a sorting process (i.e., a kind of analysis) that is involved in writing rich descriptions.

Moreover, in my study themes emerged at somewhat different points during my observations, so, for example, I was already thinking deeply about gender dynamics when I realized that "giving things up"[3] was an important thread that I wanted to follow as well. Thus, Creswell implies a linearity in the analysis process that was not true in my work. However, the overarching idea that analysis involves organizing a descriptive awareness of the study setting, then sorting and comparing to find themes, and finally interpreting the themes, reflected what I did and the advice of authors who take a more "how to" approach than a theoretical approach. For example, Angrosino (2007) separates analysis into two main forms, *descriptive* and *theoretical*, noting that descriptive analysis is "the search for patterns," and theoretical analysis is "the search for meaning in the patterns" (p. 74).

There is a wide variety of techniques that authors suggest as a means to accomplishing the goals of finding and interpreting patterns, but foremost is the suggestion that data should be *coded* as part of the analysis process (Angrosino, 2007; Creswell, 2013; Gall et al., 2003; Merriam, 2009). Merriam (2009) defines coding as "nothing more than assigning some sort of shorthand designation to various aspects of your data so that you can easily retrieve specific pieces of the data" (p. 173), and it is done by converting handwritten notes or interview recordings into typed text, and then (almost line-by-line) identifying important features in the text, which are assigned to a

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[3] By this I mean that to be in IB, students had to give up significant means of self-expression (such as gender-identifying clothing and makeup), significant and sometimes almost mythic high school experiences (like partying, football games, and experimentation with drugs or alcohol), and free time with friends or connections with specific groups of friends, among other things. As might be expected, students inside the IB culture tended to shrug off making these tradeoffs, and many had not really considered that they were, in fact, making them. Students outside IB often cited some of them as reasons not to join the program, especially with respect to social interactions. Some had concerns about prematurely setting aside "being a kid," essentially. I was unable to find subjects with whom to have detailed discussions about drugs, alcohol, and so on, but I suspect such discussions would have been interesting.

category or code. The codes (or categories) bring together incidents, observations, or segments of interviews that relate to common topics, and themselves can be organized in to hierarchies ("gender" above "gendered behavior," and "playing video games in class," for example), so that they also serve as a kind of map of the data. The researcher can examine the codes as well as the data to gain insight, and the process of creating, merging, dividing and structuring them is a way of actively engaging with the data and thinking about its meanings. Coding, like data collection, is an open-ended and non-linear process that relies significantly on intuition and inspiration, but it is an analysis step that provides at least some structure in dealing with otherwise fantastically complex information.

Other analysis techniques exist but are less universally recommended. Examples include *memoing* (writing notes to oneself about impressions and understandings that arise about the data) and *member-checking* (asking group members whether emerging understandings seem to be on track). Merriam (2009) suggests "playing with metaphors, analogies and concepts" (p. 172), while other creative ideas include analyzing dialogs for structure, or using visual devices such as flowcharts, word maps, or even doodles. Research analysis activities, in fact, are any which are used to understand the data better, and thus are part of analysis (Creswell, 2013; Gall et al., 2003; Merriam, 2009). During my work I felt that these were all things that organically happened, rather than my sitting down and deciding that I was going to try them, but that is perhaps as it should be. Behind most of these suggestions is the need to be deeply immersed in the data, to ponder it at stop lights and while brushing one's teeth, and to make at least some notes of ideas about interpretations of the data as they arise. Closeness which leads to deep

understanding is the primary goal, and people are very individual in what they do to reach that goal. As Creswell (2013) notes, "data analysis is not off-the-shelf; rather, it is custom-built . . . writers craft studies differently, using analytic procedures that often evolve while they are in the field" (p. 182). Scholars writing about qualitative data research must resort to lists of suggestions because they cannot define a specific, universal process that will yield good results.

While Merriam (2009) states that the purpose of data analysis is simply to answer the research question, it is actually a thoughtful point of view to maintain that the kind of questions asked in qualitative research often have no single answer, and even worse, no most important answer or perspective that is available to be found and described. For example, in my work at Lakeview I asked probably 40 people why so few minority students reach, or complete, Lakeview's IB program (or a similar question). I received perhaps two dozen reasonable, but distinct, answers. Students might tell me that the reason was family obligations in minority communities, or they were too far behind academically, or that minority students didn't want to try. Adults were more likely to point to systemic issues, saying that economic issues within the family held minorities back, that minority students came from poorer elementary and middle schools that did not adequately prepare them, and that lurking racism in previous schools' interpretations of policies about things like tracking had denied them opportunities. All of these are, to some extent, good and correct answers, generally having an established body of literature behind them, and a paper based on one of these themes would answer my research question. But I think that not all answers are equal in this case, and it is of value to be clear about the kind of answers that qualitative research should offer.

Qualitative research is most useful when it investigates complex situations, and addresses questions without one best answer. It need not, and should not, avoid grappling with the complexity of human-created systems like schools. It should acknowledge the multiplicities of forces that contribute to observed outcomes, as well as the fact that these forces act to varying degrees on any given individual. Yet, within this very complex setting, a good qualitative answer should impose some kind of organization on at least a group of the many factors uncovered in the study. It should interpret the setting in ways that lend insight about relationships among factors that are known to be impactful, attempting to explain why they are connected. The answer settled on will not be complete, because it cannot be. Rather, it attempts to deepen understanding about a specific aspect of the system, and it must take some risks to do so. I would also argue that a good qualitative answer should matter. That is, finding the answer should at least potentially help policymakers to respond to problems that they are solving, help group members to understand their roles with greater nuance, help individuals to learn about themselves or make changes to a problem of which they are aware, and so on. A useless answer, however subtle, clever or well-crafted, does not suffice.

If there is no possible map that will show any researcher how to know their data, there is equally no possible way to give a procedure that leads with regularity to a good qualitative answer for their study. It is for this reason that Wolcott (2005) devotes a book to describing how ethnography can be considered an art as well as a science (while suggesting as well that science can and should also be recognized as an art), and reconsiders common questions about ethnography and its methods from this point of view. Writers about ethnography frequently emphasize *interpretation, inference,* or

theorizing about the data as key goals of an ethnographic study, focuses that are at least comfortable companions to traditional scientific activities (Creswell, 2013; Merriam, 2009). However, to describe how to interpret and theorize, they must often resort to less scientific concepts, including (strikingly) *intuition*, which, to be honest, means 'just knowing.'[4] Wolcott (2005), for example, writes wondering "What can be done, or done more, to encourage fieldworkers to exercise the authority of their intuition and thus to capture their artistic insight rather than subjugate it to a determined objectivity?" I will return again to consider intuition and art in my concluding chapter and will attempt to describe from another point of view why they are so important. For my purposes here, however, it suffices to explain that the last step in ethnographic analysis is this: making a leap from descriptions, patterns and facts to a deep and holistic insight about the data, which relies much on the researcher's internal qualities, like judgment, sensitivity, and perhaps wisdom.

The product thus far of my year spent at Lakeview High School is the three papers included in this project. All certainly arise from the findings of my study, but are also crafted to relate to a single theme within that study: social and cultural barriers to minority students' participation in Lakeview's IB program (and by extension to Lakeview's richest mathematical course offerings). This focus was determined in large part by the interests of the teachers and staff who hosted me at Lakeview; over the year spanned by the study, I repeatedly heard concerned educators observe that few of the

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[4] This may not be completely un-scientific, either. It is at least reasonably well-known, if rarely acknowledged, that scientific work is often motivated by intuition (Wolcott, 2005, makes a case for this in the early chapters of his book). Research mathematicians, for example, often have quite accurate intuitions about what unsolved problems will be very difficult to solve or which might be approachable, an instance in which they can seem to be 'just knowing,' or at least, knowing without being able to make a specific, logical case supporting that knowledge.

talented Hispanic students at Lakeview were willing to try the IB program, that those who did were invariably female, and that they always attempted the program in a cohort group of other Hispanic girls. My attempts to understand and explain these observations helped direct my fieldwork, and the most compelling answers that arose became the basis for this project as a whole. The papers presented here relate to this theme in different ways: one considers available literature and theoretical understandings that deepen understanding of the research, one presents research results, and the last speaks to school communities, making policy and instructional recommendations based on the research findings.

The first article presented here approaches the idea of social or cultural factors that affect student participation in school from the point of view of literature and theory. Few authors have specifically addressed this question, so my approach was to first describe the single dominant voice in this area, that of John Ogbu, whose cultural-ecological (CE) theory has become both a motivator and a flash point among scholars seeking to understand differences in school participation among minority groups. I attempt to show that CE theory describes an important phenomenon (students' reluctance to participate in school arising because of social pressures from peers and in-group members) that is not only observed in some minority communities but also in subcultures ranging from working class neighborhoods, to rural whites, to boys of many backgrounds and ethnicities. From this more general point of view I note many criticisms of CE theory and acknowledge work to be done, while continuing to emphasize that the phenomenon in question calls for dialog and eventual understanding, nonetheless. I conclude by suggesting, in essence, that only by confronting problems, including social problems, can

we hope to have leverage over them and in this case to create opportunities for school and mathematics achievement for students who are members of communities that may discourage school participation.

The second paper summarizes my research results. Although ethnographic research is often so extensive that it is published as a book, in this case the narrow focus I adopted made it possible to write at least a selected portion of my research results in an article format, treated similarly to a case study. In this work, the source of social constraints on minority participation and success in advanced programs is suggested to be at least twofold, including cultural aspects of the IB program which tended to discourage or exclude minority students, and dynamics within minority students' social environments that may make high academic achievement more difficult for those students. Within the IB community, for example, high levels of stress and an appearance of elitism make joining the program less appealing for some students, while rigid cultural standards for inclusion as IB community members may lead to minority students' having trouble being accepted even if they choose to attempt the program. Yet, outside the IB program, social expectations concerning gender expression and conflicts between some important segments of the student population may also contribute to fewer students attempting IB, especially minority boys. The study concludes by reflecting on the important, but often hidden, effect of school and student cultures on student participation and success.

Finally, in my third paper I speak to school administrators and faculty in a practitioner-oriented paper that suggests "on the ground" approaches for dealing with social dynamics that may result in students' resistance to school participation. The tone of

this paper is similar to a discussion piece; it is less formally written and somewhat more lightly cited than the others included in this project. It also contains some anecdotes, which were intended to illustrate the problem that the paper addresses or to add dimension to ideas from research. These stylistic choices were motivated by the submission guidelines of a specific educational journal (*Educational Leadership*), whose readership seemed to be an appropriate audience for the chosen theme. As recommended in the guidelines, I tried to achieve a "conversational" style, and to include practical examples. However, the suggestions offered are supported by my own research study at Lakeview, or scholarly sources that consider the topic of social dynamics and student achievement within schools.

The paper focuses on ways in which academic labels can become part of individuals' and groups' social identities, especially as the result of ability grouping which results in segregation within classrooms. I intended to evoke the idea of segregation very broadly, to include groupings or separations by gender, race, SES, ethnic background, or other attributes which are discernable by students and which can be used by them to make generalizations about people, school learning, and society as a whole. After describing some consequences of allowing students to develop these generalizations, the paper goes on to suggest ways in which schools can disrupt them or keep them from forming, and cautions practitioners to be careful of allowing students to create their own academic groups, which may in fact reproduce inequities that students have internalized.

Like the first two articles, this one treats Lakeview's staff's questions about why few Hispanic students chose to attempt the school's most advanced program, and in

particular what social dynamics may tend to underlie minority achievement patterns that they observed. In this case I chose to highlight a new theme from my data, the idea that social groups which form early in a student's schooling are crucially linked to specific academic paths. Students at Lakeview had surprised me when they made connections about social and academic positioning and status, for example talking about high-achieving, high-status groups for whom having attended the best elementary and middle schools was still important even as juniors and seniors in the IB Diploma Program. Invariably white and generally well-off, such students were essentially functioning as the academic "old wealth" at the school, and I was taken aback at the degree to which this early school history conveyed additional privilege and status, as well as created long-lasting social connections which tended to concentrate academic advantages within their smaller friend groups (a dynamic that is briefly discussed in the research paper described previously). It seemed obvious also to ask the related question of how less successful students' previous schools and social connections impacted their school trajectories, and I included some of the understandings that arose from pursuing answers to that question in this work. Many of these are supported by other scholars' work (such as research into the development of academic identity, or the effects of tracking), but I connected them as I did because of understandings that arose from my own study.

It seems apropos to finish by considering a final theme: mathematics. In discussions leading up to this project, one of my committee members made it clear that at the outset, mathematics education was not obviously an important element in the research question I was pursuing (and indeed, Lakeview's interests were certainly more general than mathematics). He promised to ask me "where's the mathematics?" when it came

time to defend my work, and he encouraged me to have a satisfying answer ready. As a result, I have been thinking deeply about the place that mathematics holds in students' school experiences, and about how my work describing student culture and student social dynamics contributes to understanding the teaching and learning of mathematics.

As a comparison, it is useful to touch on the example of research into gender and mathematics ability, a topic that has been actively discussed for 50 years, and which is almost unique in that it has led to a concrete, widely accepted conclusion inverting earlier understandings. We, as a research community, have largely moved from believing that girls are biologically disadvantaged in the study of mathematics, to believing that no important gender differences exist that should affect learning outcomes for any students of mathematics. Rather, all of the differences that have long been observed in girls' outcomes, from the almost-exclusively male ranks of scholars who have developed the subject through history, to the underrepresentation of women and girls in mathematics classes, programs, and degrees attained through much of the last century, all arose from culture and social dynamics. That is, they arose because of how communities and families communicated expectations about who girls should aspire to be like, what work they should do, and what they could do and learn while still being feminine, accepted, and valued. They arose because of how girls themselves absorbed these messages and communicated, within their peer groups and circles of friends, the boundaries of acceptable behavior, including participation in school and displays of intelligence. They arose because of how schools, classrooms, and teaching were organized, and the assumptions that were made by faculty and staff about girls' abilities, goals, and appropriate roles. The amazing power of these accumulated cultural messages can only

now be appreciated, mostly in retrospect, as our society is able to observe the effect of changing them.

Social messages to women and girls through the centuries had no effect on girls' (often latent) potential to do mathematics, but it profoundly changed the extent to which they participated in mathematics. It also likely changed how mathematics was taught (because the methods were chosen to be culturally appropriate for a specific social group that excluded girls), and what mathematics was constructed in research or applied for practical purposes (because these also were motivated by a worldview which privileged some ideas and purposes above others, and that worldview again did not represent women's voices or interests). The concerns of mathematics education, in fact, are wound together with changes in culture and social norms, and this is true of the dynamics which I write about as well, although the implications of, for example, some subcultures defining masculinity in ways that inhibit their mathematics participation are not yet a topic of wide interest among mathematics educators. I am, myself, content that the work I have done contributes to our understanding of mathematics education.

A final question is whether I have conveyed that connection appropriately. In my first two papers, especially, I hope that I have. In the first I briefly make my case for the connection between cultural forces and students' mathematics participation, as well as research, and I wrote for an audience of mathematics educators. In the second, I deliberately attempted to embed generalizable principles into a mathematical setting, speaking at once to students' participation in mathematics, access to mathematical communities, and peer cultures. But in the third I am aware that implications for mathematics in my argument are more implied than overt. Still, mathematics--how we

teach it, how we track for it, what expectations we communicate for it--absolutely lies at

the core of the dynamics I describe, and mathematics outcomes are too often influenced

by them. Because of this the generality in tone is perhaps forgivable, especially in light of

the contributions the paper makes to the theme of social and cultural dynamics which

influence students' participation in school and in mathematics, and its potential to answer

one more question for Lakeview's staff.

CHAPTER II

SCHOOLS, STUDENT CULTURE, AND UNDERACHIEVEMENT: TOWARDS A THEORY OF WHY SOME MATHEMATICS STUDENTS MAY NOT TRY

Mathematics educators, school administrators, and policy makers are increasingly concerned about the persistence of achievement gaps in the academic attainment of many at-risk groups, including African Americans, Hispanics, Native Americans, and low SES students of any background. Changes in school funding and policy stemming from court decisions and legislation over the past 50 years have meant that increasing numbers of these students are experiencing more equal conditions (although not necessarily equity) in terms of some important aspects of school learning, such as the quality of classroom facilities and teacher training. At the same time, some trends in the education community have encouraged efforts to improve less tangible aspects of students' school experiences by implementing deeper curricula, reducing tracking, and increasing cultural responsiveness. These changes have not been successful in closing academic achievement gaps, which in many cases have narrowed only slowly (Hansen, Levesque, Quintero, & Valant, 2018; Reardon, 2011). Meanwhile, studies in schools with high-quality facilities and the most equitable conditions available show that the same student groups mentioned above continue to underperform even in these privileged environments (Lewis & Diamond, 2015). Achievement gaps in some cases do not seem to have closed in proportion to improvements in school environments.

These observations suggest that although factors like school facilities and curricula are very important in student success, there must be others which are also important, and which are not being sufficiently addressed by current educational improvement initiatives. Race and ethnicity are known factors: decision-making in schools in areas such as tracking, discipline, and gifted referrals is still systematically racially disproportionate, and inequities such as these undermine attempts to raise the achievement of some student groups (Ford, Grantham, & Whiting, 2008; Lleras & Rangel, 2009; Oakes, 2005; Skiba, Michael, Nardo, & Peterson, 2002). However, sometimes underperforming students are united by a common home or community culture rather than by race, as for students from rural or working-class urban communities, and in these cases social and cultural factors other than racial bias may be important in shaping student achievement. Students' understandings, attitudes and learning are informed by all cultural and social conditions that they experience, including interactions they have with their families, school staff and faculty, peers, and the media. These interactions can be formative in students' constructions of themselves in realms as diverse as gender and work roles, and also as mathematics learners. Important mathematical behaviors like class participation, effort, and persistence may be influenced by them, and these in turn play a part in unequal mathematics achievement among crucial segments of the population, including cultural minority and low SES students, and potentially other groups.

Underachievement as Reported in Studies of School Culture

Culture and social environments are usually studied using qualitative research, especially ethnography. Moreover, educational ethnography, an active field since the

1970s, has produced scores of studies that provide insights into the social workings of many diverse schools and student populations. This creates an opportunity to understand culture and the influence of social environments on individuals in a new way: by exploring themes that are repeated across cultures and in many settings, and hence appear to be clues indicating areas of commonality in human experiences and human reactions to those experiences. Because of this, these studies, taken together, are important as a way to theorize about how culture and social dynamics affect students' school participation.

One of these common themes is a lack of engagement and effort in school among important at-risk student groups. This pattern has been noted previously by Fryer (2006), Foley (1991), and others. Well-known examples include Willis's (1977) work with lower-class British youth, Peshkin's (1997) study of Native American students in a tribally-governed high school, and MacLeod's (2009) study of a lower income neighborhood in Massachusetts in the 1990s. The student groups studied shared a kind of ambivalence or, in some cases, an outright hostility or contempt directed at the 'mainstream' or dominant culture in which these groups were embedded, and by extension towards the school culture, curriculum, and academic settings which represented (and conveyed the norms of) the mainstream. Students verbally expressed these negative feelings while at the same time researchers observed the students enacting a rejection of the educational opportunities offered to them, shown by not participating in class, cutting class or engaging disruptive behaviors.

Of course, these student groups experienced lower achievement as a result--in some cases dramatically lower, and in others a more nuanced flattening. This rejection happened even though at some level the students expressed understanding that the cost of

this resistance to schooling was a loss of future opportunity. For example, the working class "lads" that Willis observed gave up a chance to do more engaging, less physical, and better-paid work than the blue-collar manufacturing work of their fathers. The Pueblo children in Peshkin's study limited their possibility of attending college, working away from their reservations, or credentials that could have helped their tribal communities solve problems in health care, education, and managing natural resources. MacLeod's "Hallway Hangers" experienced a variety of problems as adults which were arguably rooted in the rejection of school, including the consequences of criminal histories, work at arduous unskilled or semi-skilled jobs, and instability in their personal lives and finances.

This dynamic is of crucial importance to mathematics educators for at least two reasons. The first is that the strength of this common theme, arising in observations of such widely varied populations, suggests that more or less deliberate underachievement (in all academic areas but certainly including mathematics) is fairly common, but is perhaps underappreciated by educators and scholars. This factor is therefore largely missing from mathematics education research and may quietly confound studies (especially those concerning engagement or motivation, including studies of culturally responsive teaching), or go unrecognized in our classrooms, inhibiting achievement in populations which many of us have a particular commitment to reaching. Not understanding the reasons why this type of disengagement arises, and the conditions in which it flourishes, also makes it impossible for us to address it effectively and may perpetuate it.

Cultural-Ecological Theory: A Dominant
View of School Underachievement

There is at present only one widely-known theory which provides insight into observations noted above: cultural-ecological theory (CET), which originated in the writings of John Ogbu. Ogbu was a Nigerian immigrant and an anthropologist, whose dissertation research was an educational ethnography set in a multicultural high school in Stockton, California, during the late 1960s, and whose later work can largely be viewed as attempts to explain his observations there. Ogbu's goal was to create an overarching theory, what Foley (1991) calls a "universalistic, explanatory theory" (p. 63), which would provide insight into how culture and social norms contributed to broad patterns of student achievement, especially among traditionally unsuccessful African Americans. His work emphasized cultural dynamics within minority communities, families, and peer groups, but he acknowledged that cultural factors within society, like discrimination in job opportunities and unequal conditions within schools, were also determinative in student outcomes.

Driving much of Ogbu's early work was an inversion of the common-sense understanding that a person's educational experiences are formative of later job opportunities; Ogbu (1978) upended this association to suggest that education is in fact driven by the perceived availability of appropriate jobs. He described this as a multi-level mechanism. In the larger social system, for example, minority students' schools educated them according to understandings within the dominant culture about what work they would, or should, do as adults. At the time Ogbu was initially writing, he might have pointed at assignment to vocational tracks as a way in which the dominant culture steered

minority students toward educations that prepared them only for manual work, which reflected, and indeed, perpetuated, their lesser social status.

However, Ogbu found that jobs drive educational opportunity within students' own families and communities as well. For example, Ogbu suggested that communities are united by *folk theories* of "getting ahead," which he also called *status mobility systems* (Fordham & Ogbu, 1986; Ogbu & Simons, 1998). These folk theories are not necessarily based on objective facts but rather reflect the traditions and beliefs of the social groups that hold them; they outline the paths to adulthood that the groups believe are valid and attainable for their members. In doing so, folk theories promote achievement along some paths by validating them and affirming opportunity at the end, but they inhibit other kinds of achievement which are not seen as viable or are simply not considered. Ogbu's early work often describes communities of low SES African Americans who correctly perceived that they were largely denied opportunity because of racial prejudice and systemic "job ceilings," and who therefore, quite rationally, raised their children prepared for a hardscrabble life on society's fringes. Thus, Ogbu explains that students' academic underachievement reflects inequities in school opportunities and job markets, but also alternative understandings of "making it" that are transmitted in their home communities (Ogbu, 1978, 1986).

An important aspect of CET was Ogbu's classification of immigrant groups into categories according to characteristics of their status mobility systems (Ogbu & Simons, 1998). He suggested four minority groupings: *autonomous* minorities, *refugees*, *voluntary* or *immigrant* minorities, and *involuntary*, or *caste-like*, minorities. Autonomous minorities include Jews, the Amish, and other groups that co-exist with some measure of

equality alongside the dominant culture, while choosing to maintain separate identities to some degree. Ogbu wrote little about autonomous minorities or refugees and did not explore the implications of his theories for those groups. Instead he focused on voluntary and involuntary minorities, often comparing aspects of their status mobility systems and school attainments. Voluntary minorities included any immigrant groups who came to the United States by choice, such as European immigrants and most Asians. Ogbu suggested that these groups are characterized by a status mobility system which frames discrimination and other difficulties in American society as "barriers to be overcome," and a belief that social status and economically rewarding positions are attainable through hard work. This set of beliefs encourages effort and achievement in school and results in the high academic achievement associated with these groups.

In contrast, Ogbu categorizes African Americans, Mexican Americans, and Native Americans as involuntary, or castelike, minorities. These groups did not choose to become Americans, but instead were subsumed by the U.S. at various times through slavery, colonization, or annexation. Further, they all experienced a history of violence, oppression, and discrimination which contributed to the formation of status mobility systems that affirm that barriers to success are often the product of systemic, unalterable discrimination against both the group and individual, regardless of hard work. Ogbu theorized that these conditions undermine academic effort, because they suggest that school credentials will not result in better lives for group members who attain them (Ogbu, 1986; Ogbu & Simons, 1998). Instead, the status mobility systems of involuntary minorities may promote faith in unlikely, but culturally sanctioned, opportunities for advancement (such as entertainment or professional sports in the case of African

Americans), or suggest alternate paths outside of the mainstream social system (like hustling). These sociocultural messages result in lesser academic efforts, and account for a proportion of the achievement gap for those groups.

Cultural-ecological theory (CET) suggests that another part of the achievement gap for involuntary minorities is a social dynamic that Ogbu called *oppositional culture* (Fordham & Ogbu, 1986; Ogbu, 1986; Ogbu & Simons, 1998). Ogbu believed that minority groups which experienced historic oppression create communal norms rejecting many of the behaviors and cultural markers of their oppressor group, such as clothing, music choices, and speech patterns. Alternate forms of these are adopted as being typical of, and appropriate to, the minority community. These become *markers of group identity*, in the sense that they are expected of group members, and are reinforced through social interactions within families, communities, and peer groups. These norms could be counterproductive to school success if, for example, sitting quietly in school, speaking standard English, or working for good grades become associated with white society and as such is designated as inappropriate for minority group members. Ogbu's claims that minority groups reinforce these group norms through peer pressure were developed by Fordham, and became independently well-known under the euphemism "acting white." This specifically refers to peer groups' chastisement group members who adopt behaviors associated with white culture, particularly with the goal of achievement in school (Fordham & Ogbu, 1986).

Ogbu's theory has been both widely studied and widely criticized over the past 30 years. Many African American scholars, in particular, suggest that Ogbu's ideas represent a deficit model (e.g., Quaylan, 2015), and interpret his theory as implying that there is

something wrong in black students and communities, causing academic underperformance; some, indeed, call his approach victim-blaming (e.g., Lewis & Diamond, 2015). This perception may arise from elements of Ogbu's work as fundamental as his motivating question, which asked why, in the face of similar levels of prejudice and disenfranchisement, immigrant students such as Chinese Americans were able to succeed in school and "make it" while in many cases African American students were not. The "acting white" hypothesis, in particular, has been painful for many, because it posits that families, communities, and peer groups may be active in reining in some minority students' achievement. Despite this perception, there continues to be conversation among scholars in which the "acting white" hypothesis, and more generally the concept of oppositional culture, are considered.

Qualitative research has established that some minority students do use the phrase "acting white" as a rebuke, and as a way to maintain group behavioral norms in at least some settings (Bergin & Cooks, 2002; Tyson, Darity, & Castellino, 2005). Behaviors that are sanctioned this way may include minor-seeming matters of personal taste like clothing or music choices, as well as associating with whites, having white friends, or dating white peers, as well as being "stuck up" or "uppity" (Bergin & Cooks, 2002; Ford et al., 2008). More importantly, in some settings academic behaviors may also be criticized this way, including speaking standard English, taking AP classes, answering questions in class, or getting good grades (Bergin & Cooks, 2002; Ford et al., 2008; Tyson et al., 2005). It is important to note that although researchers find that this behavior is an important dynamic in some schools, it is not found in all communities of minority students (Carter, 2005; Lewis & Diamond, 2015; Olitsky, 2015; Tyson et al., 2005).

Quantitative researchers, in general, have had mixed success in providing evidence supporting the hypothesis that peer and community behavior norms, enforced by sanctions (e.g., the acting white accusation), contribute to minority underachievement. Several studies have tried to measure whether high-achieving minority students are less popular than either lower-achieving peers or similarly successful whites; for example, Ainsworth-Darnell and Downey (1998) and Cook and Ludwig (1997) did not find that high-achieving minority students experienced less popularity. Fryer and Torelli (2010), however, using different data and measures, found that achievement was correlated with having fewer friends for African American and Hispanic students. Wildhagen (2011) found no evidence for a "strong form" of the acting white hypothesis in which peer sanctions directly result in lower academic engagement but noted that in some schools where there is a correlation between race and classroom engagement. She suggested that "racialized norms about academic achievement, the perceived cost of peer sanctions . . . (may) cause academically successful African American students to feel ambivalent about enrolling for AP courses, *even when those students do not personally subscribe to the racialized norm*" (Wildhagen, 2011, p. 425, emphasis in the original).

Wildhagen's (2011) observation that a simple, one-dimensional version of the oppositional culture theory (including its indicator, the "acting white" accusation) is not clearly supported by available data is a valuable one. It is important to note that the underlying conditions that Ogbu observed, and which he claims as antecedents for cultural norms like school opposition, have changed. It has been 50 years since Ogbu's initial observations, and American culture has undergone an enormous evolution since then. Ogbu himself seems to have been nonplussed that changes in labor market

accessibility, for example, did not have more immediate effects on some of the cultural conditions he described. His later work, such as the ethnography he did at Shaker Heights (Ogbu, 2003), appears to reflect a perhaps-unreasonable expectation that changes in job availability for African American individuals would be quickly reflected in family and community norms better supporting African American students' school achievement. Indeed, the study is sometimes read as censuring the middleclass African American community at the center of his study.

Although Ogbu may not have been satisfied by the pace of cultural change during his career, as social and economic conditions change, social norms adapt or change as a result. In particular, it is reasonable that oppositional culture as Ogbu described it may lessen, cease, or take new forms over time as minorities' opportunities and social conditions change (see Gould, 1999, for a detailed discussion). Indeed, it must always have admitted considerable variation, as cultures and norms are always local and variable (Foster, 2004). Finally, it is important to remember that Ogbu acknowledged that there were, at all points in history, individuals within involuntary minority communities who *did* succeed, so oppositional culture could not be seen as universal at any point in time. Ogbu's intention was always to describe general cultural trends that helped explain patterns of achievement on a large scale, so his theory was not crafted to account for variations at the community or individual level. Criticisms of CET are often well-founded both theoretically and from research results, but at the same time CET has compelling explanatory power in some settings (Foster, 2004), suggesting that an effort to clarify and enhance CET may be useful.

Beyond Ogbu's Cultural-Ecological Theory

Scholars have viewed student rejection of schooling through many theoretical lenses over the past 50 years. MacLeod (2009), for example, used several social theories, including Bourdieu's theory of human capital, as a way of reflecting on his observations, while Willis (1977) focused on a socialist, class-based theory that focused on the reproduction of disadvantage through work and school. Austen-Smith and Fryer (2005) offered an analysis of school opposition from the point of view of economics using incentive theory. Slee (2014) and Furlong (1991) described a sociological theory originating with the work of Durkheim (1950), which views school opposition as a reasonable response to social conditions that the students face. Slee (2014), for example, notes that opposition reflects realities in students' home cultures, but also is a way for "academically unsuccessful cohorts of students form subcultures where success can be redefined and secured" (p. 447). And Foley (1990) created a theory to account for the importance of class in the school achievement of Hispanic students in a south Texas town.

However, none of these analyses has been completely satisfying, in part because they lack the scope of Ogbu's theory, but also because scholars increasingly demand that theoretical conceptions of identity, social status, and culture admit greater complexity (Foley, 2004; Foster, 2004; Stinson, 2011; Warikoo & Carter, 2009). As Carter (2005) correctly suggests in critiquing Ogbu, many are now no longer comfortable with "binary" descriptions of complex units of analysis, like people and their social or cultural settings. Rather, conceptions of school opposition and students who resist school must clearly acknowledge the influences of multiple factors that are formative of identities, such as

gender, SES, ethnicity, and family history, as well as setting and context. Further, as Warikoo and Carter (2009) point out, a model that simply layers on additional attributes would also not be subtle enough, since "research that simply adds different variables of identity . . . misses the ways in which these social identities intersect, often in surprising ways" (p. 381). Thus, while both quantitative and qualitative research has suggested important aspects of identity and setting which Ogbu did not account for in CET, they have also provided clues to conditions from which school opposition may arise.

As an example, research into 'acting white' (taken as an indicator of oppositional culture) has begun to consider the kinds of schools and communities where school opposition is likely to occur. While evidence clearly shows that resistance to school is not an important factor in all groups of involuntary minorities where Ogbu predicts it (Foley, 1990; Lewis & Diamond, 2015; Quaylan, 2015; Tyson et al., 2005), other research shows that it is an important dynamic in some schools or among some groups (Ainsworth-Darnell & Downey, 1998; Mickelson, 1990; Mickelson & Velasco, 2006; Tyson et al., 2005) and suggests where it may be important. That is, most authors find opposition to be more common in integrated schools, especially those in which there is little diversity in higher tracks (Fryer & Torelli, 2010; Mickelson, 1990); in contrast, private and parochial schools may be least affected (Fryer, 2006). These results imply that the ethnic composition of schools may play a part in opposition; underlying this, however, is a deeper issue of the policies and social norms that may exist (or be prevented) in these types of schools which cultivates opposition (or heads it off). As Warikoo and Carter (2009) note, schools function as cultural actors, and by their decisions and messages

create cultural environments which may result in entrenched social hierarchies; similar dynamics may contribute to student opposition.

Scholars also find evidence that gender is an important factor in resistance to school. Using data from the National Education Longitudinal Study (NELS) of 1988, for example, Lundy and Firebaugh (2005) claim that oppositional culture plays a key role in male students' underachievement. Carter (2005) uses qualitative data to describe how minority boys and girls have difficulty resolving conflicts between their gender identities and school settings, with girls more likely to become "cultural straddlers" who find strategies for coping in both environments, and boys less likely to do so. Boys may be more likely to resist school or form oppositional peer groups. Indeed, the classic ethnographic studies of the 1970s to 1990s (including those cited in this paper) reflect the typical male orientation of those times, in that they investigate male students almost exclusively, and in fact are often set in environments in which gender norms for males were exaggerated and highly ritualized (e.g., working-class neighborhoods, immigrant populations, or communities of poverty). So, the initial descriptions of school resistance were made in settings in which opposition might be particularly strong, but also might take forms that are characteristic of boys. A theory of school opposition which is more nuanced should consider ways in which girls might reject school in different ways than boys, or in which opposition to school might be best described as a spectrum of possible enactments, with some levels or forms resulting in a flattening of school achievement rather than an obliteration of it.

Farkas, Lleras, and Macuga (2002) describe "systematic" variance in the incidence of oppositional culture, with minority status or ethnic identification an

important factor, but in conjunction with other variables like SES, gender, urbanicity, school environment, and family factors like parental education. They suggest, for example, that:

> . . . an African American or a Hispanic male student who comes from a poor family, has a parent who dropped out of high school, and who attends a low-income, central-city public school would have a very high risk of finding himself within a peer group that negatively sanctions school effort. (Farkas et al., 2002, p. 152)

Other studies have also affirmed that opposition to school and "acting white" are misunderstood if they are taken as phenomena just of Black students, of all Black students, or as being mostly a consequence of race (Tyson et al., 2005).

Finally, opposition is also misunderstood if it is seen as a conscious choice, a rational decision made in response to a cost-and-benefit analysis of job availability or other social conditions as suggested by Willis (1977) and others. Ogbu, although often read as supporting the idea of opposition as deliberately enacted, had an understanding of the process as a cultural dynamic that is often unconscious, or at least unquestioned (Fordham & Ogbu, 1986; Ogbu, 1986). As Furlong (1991) described, opposition to school may be an emotional reaction to students' social environments, in which students turn away from school because they cannot resolve conflicts between their identities as formed in relationship to community, family, and peer groups, and the ways in which schools attempt to construct students' values, abilities, and occupational identities according to a uniform, mainstream ideal. A satisfactory accounting of school opposition will incorporate these insights, describing a spectrum of possible behaviors in localized

students peer cultures, that arises in specific contexts and among students who are not necessarily similar in race or ethnicity but share common challenges, conditions, and aspects of culture.

Conclusion and Implications

Ogbu's (1986) theory presupposed a number of conditions which he observed in schools and American society during his research years between the late 1960s and the 1990s, including "job ceilings" that limited involuntary minorities' economic prospects whatever their educational background, stable minority communities with little social mobility but very strong cultural ties, and a mainstream culture so rife with discrimination that describing it as "castelike" had an ugly ring of truth. These conditions had persisted for decades, with few changes. But since Ogbu began his work, society has undergone a period of unprecedented change, and the conditions which underpinned CET have altered, generally for the better (although significant inequities still exist). Research after Ogbu's may in fact be describing changes in school opposition, as well as discovering variations that have always existed--a possibility that again suggests that oppositional culture theory should be revisited.

School opposition is still an important and troubling phenomenon in many schools. Characterized by small student subcultures or peer groups that resist adapting to school and choose not to learn, opposition affects students at risk of failure for other reasons, and whose families and communities often need the advantages that come with educational attainment, including business and job opportunities and a stronger political voice. While research has often focused on high achieving and gifted students who are affected by opposition in the form of "acting white" accusations or social isolation (Ford

et al., 2008; Mickelson & Velasco, 2006; Stinson, 2011), but scholars should also determine whether school opposition is at play in cases when students are not successful, when talented individuals select lower tracks typical of their friends, and when student efforts seem deliberately calibrated to pass, but not to excel. This research would give educators ways of understanding how to work with students who have selected low tracks for social reasons, and to understand student priorities better by considering how school resistance is founded on the normative behaviors and group expectations within student subcultures.

Schools generally rely on psychological models and remediations in the face of school resistance by individual students, especially when it takes the form of disruption, but these models may not identify or address forms of opposition which are based in student peer culture and affect groups of students together. Similarly, teachers who prioritize well-managed environments may not perceive student disengagement as part of a larger pattern which is founded not on an inability to focus or impulsiveness, but rather on choices students make in order to negotiate social expectations like gender norms or peer group expectations. Without making this connection behavior may be addressed, but creating the potential for greater school achievement is not. Frames of reference, of course, shape our conclusions about problems we observe, and our responses to them. Recognizing the dynamics of oppositional culture in addition to individual motivations causing underachievement may provide ways to help intervene with groups of students who could succeed, but who are surrounded by social forces that undermine school effort and achievement by embracing group norms that oppose them, or oppose more than a little of them.

Finally, mathematics educators may guess that if opposition or resistance to school exists, then opposition or resistance that is specific to mathematics learning certainly also exists, perhaps occurring both alongside the larger phenomenon and alone. Some elements that ethnographers have linked to school opposition, such as associating content with the dominant culture, strong emotional experiences and a need among some groups to redefine success, are perhaps even more strongly characteristic of mathematics than school as a whole. If resistance or opposition to mathematics learning does exist as a social dynamic, and not just in individuals, its parameters should be found and its mechanisms understood, especially with respect to cultural elements common to the teaching and learning of mathematics that might affect it. And while there are many ways in which this knowledge could enhance the work of mathematics education, of particular importance is the possibility that it might offer new means of helping at-risk and minority students to learn.

CHAPTER III

**THE IMPACT OF SOCIAL FORCES ON STUDENTS'
ACCESS TO ADVANCED MATHEMATICS
COURSES: ETHNICITY AND GENDER
MATTER**

It is known that minority students, such as Hispanics, African-Americans, and

Native Americans, and low SES (socio-economic status) students, typically have lower

academic achievement, and in particular lower mathematics achievement, than

mainstream white or Asian minority students (Stark & Noel, 2015; U.S. Department of

Education, 2016). This appears to be true regardless of whether highest course

completion or attainment milestones such as high school graduation, college

matriculation or degrees awarded are used as measures (Stark & Noel, 2015). These

statistics are of concern because academic attainment is often an important component in

a population's overall economic success; conversely, lack of academic achievement may

be a factor in a continuing pattern of social and economic disadvantage (U.S. Department

of Education, 2016). In particular advanced mathematics courses such as Advanced

Placement (AP) Calculus lead students towards four-year degrees, technical or skilled

work, representation in social decision-making and firm financial footing as adults

(Langdon, McKittrick, Beede, Khan, & Doms, 2011). Therefore, supporting minority and

low-SES student groups to attain higher mathematics achievement, and proportional

representation in advanced mathematics programs like AP, is an important part of

achieving a more equal society.

But the question of access to advanced courses, especially advanced mathematics courses, is complicated. It is clear that the continuing existence of inequities in our school system often means that minority and low SES students are less well-prepared for high-achieving tracks when they get to high school (Hemphill & Vanneman, 2011; Reardon, 2011) than middle-class white students may be. In part this may be because often minority students are required to learn in schools that lack funding and qualified teachers (Flores, 2007; Peske & Haycock, 2006). Discrimination and prejudice may also mean that these students experience lower expectations and are less likely to be invited to participate in advanced courses or honors programs (Ford et al., 2008). Research among community college students (Nora, 2003) and high school drop outs (Bradley & Renzulli, 2011) suggests how economic disadvantages, too, may impact talented and well-prepared minority or low SES students' choices. Families' immediate economic needs may lead students towards paths that offer more immediate economic benefits, and away from greater, but more remote, advantages of which advanced mathematics classes are a part. These social dynamics, sometimes called "pull-out" forces, may be intertwined with social norms and expectations, such as family culture or gender roles, and may be affected by the opportunities or barriers presented by the climate within individual schools and each student's peers as well (Berkowitz, Moore, Astor, & Benbenishty, 2016; Bradley & Renzulli, 2011). Social forces act in ways that are less direct and visible than factors like differences in background knowledge or inequities in school environments, and they are more variable because the family and friend groups of each individual are unique. However, these forces are very important in how individuals imagine their lives and their futures, which opportunities they perceive as useful or attainable, and thus what

choices they make. Because mathematics classes are stepping stones to specific imagined

futures (either college or careers), students may enroll in them or not in response to each

student's social environment.

This paper uses a case-study approach to report on selected themes from the

results of a larger ethnographic study. The themes included here involve ways in which

student in-group boundaries (both in higher and lower track students) and gender roles (in

both girls and boys) were observed to play important, but often hidden, roles in students'

peer culture and class participation, in ways that have important implications for their

program choices and course selection. The issues of gender and academic culture are

treated together in this paper because these social forces seemed to intersect in sometimes

surprising ways: gender often determined how academic experiences were chosen and

experienced, while academic settings and students' academic social groups influenced

gender expression in ways that sometimes amplified, but sometimes muted it.

Reasons for Minority and Low Socio-Economic Status Students' Lower Representation in Advanced Mathematics Classes

In recent decades, the most influential theory that considers cultural factors and

minority achievement has been Ogbu's cultural-ecological (CE) theory (also called

oppositional culture theory), because of its sweeping scope and applicability (Ogbu &

Simons, 1998). Cultural-ecological theory suggests the primacy of social and economic

environments in determining minority students' patterns of engagement, predicting that

some groups of minorities will be able to participate fully in school and will be

successful, but other groups will not. In either case, these differences are due to outward

conditions that minority groups experience, such as reasonable access to desirable jobs,

as well as to the histories of those minorities within the United States. Moreover, Ogbu also suggests that social pressures exist that tend to maintain current conditions (Fordham & Ogbu, 1986; Ogbu, 1992; Ogbu & Simons, 1998).

Key to CE theory is the contention that American minorities can generally be separated into two groups--involuntary and voluntary minorities--which have common patterns of school achievement (Gibson & Ogbu, 1991; Ogbu, 1992; Ogbu & Simons, 1998). *Involuntary minorities*, sometimes also called *caste-like minorities*, never chose to be part of American society, but rather were absorbed into it (albeit in a variety of ways). African Americans and Mexican Americans are examples of involuntary minorities. While culturally very different, these groups share a history of entrenched discrimination, social wrongs, and persistent denial of economic fairness which forced them into a generational underclass. Within these communities, Ogbu suggests that coping with prejudice and its effects led to the development of "oppositional culture," which means that involuntary minority groups come to reject many aspects of dominant American culture and do not want to assimilate into it. As part of this rejection, they may resist dressing and speaking according to mainstream American norms, for example, and refuse to engage in activities such as schooling because those activities are seen as characteristically "White," or of the oppressor class, and thus by their own group's definition are inappropriate for them (Fordham & Ogbu, 1986). This portion of Ogbu's theory became independently famous: the term "acting White," which describes one aspect of oppositional culture (Fordham & Ogbu, 1986; Ogbu, 1992), has been adopted by mainstream media and commentators, and is often applied to mean that minority students will enforce cultural boundaries by chastising one another if, for example, a peer

from their culture follows school behavioral norms, speaks standard English, answers questions correctly in class, cares about grades, or similar. The term therefore evokes the negative pressure on minority-culture individuals who attempt to behave in ways that are not part of culturally-sanctioned patterns, and often refers to in-school dynamics.

Ogbu's second group is comprised of *voluntary minorities* who, in contrast, chose to come to the United States in search of opportunity; Asian and European immigrants, in general, are examples of voluntary minorities. Although this group of students may encounter bias and economic difficulties in school, Ogbu claims that they expect those conditions to be temporary and believe they can be overcome with effort. In particular, they believe in the American dream: they expect hard work in school to be rewarded by economic advantages and social benefits in the future. While they often encounter discrimination that is comparable to that leveled against involuntary minorities, they see difficulties as temporary, as "barriers to be overcome," and they are supported by their communities in confronting them. This leads to much more positive outcomes, in part because this group is not concerned about possible political or social implications of the differences between home and school norms, and so assimilates well into school culture (Gibson & Ogbu, 1991; Ogbu, 1992; Ogbu & Simons, 1998).

Ogbu's theory has been studied and criticized through the years for many overgeneralizations, assumptions and other deficits. For example, several authors have pointed out that there is much more variability in minority student outcomes than Ogbu's theory indicates, with some involuntary minorities doing well (e.g., Conchas, 2001; Gibson, 1997; Valenzuela, 1999) and some voluntary minorities doing poorly (e.g., Lee, 1996). Others criticize his failure to account for class and SES, pointing out that

economic issues strongly impact decision-making in families and communities (Foley, 1990, 1991, 2004). Many studies have also tested the notion of an oppositional culture as Ogbu describes and determined that such a culture is either not present in many minority student communities or did not have the pervasiveness that he suggested (Diamond, Lewis, & Gordon, 2007; Harris, 2006). Others have tried and discarded his notion that a kind of cost-benefit analysis based on the availability of jobs and the likelihood of discrimination is driving students' academic disengagement (Beattie, 2002), and the whole idea of "acting White" as a phenomenon, especially as a criticism aimed at high-achieving minorities for out-performing their peers' notions of appropriateness, has generated a small genre of literature, both critical (Ainsworth-Darnell & Downey, 1998; Tyson et al., 2005) and supportive (Bergin & Cooks, 2002; Ford et al., 2008). Finally, a number of authors have suggested that oppositional culture theory, including most attempts to explain the "acting White" hypothesis, lacks nuance and should be reconsidered in light of current understandings of how important aspects of students' identities like race, ethnicity, social class, gender and family immigration history may intersect or act as a system (Conchas, 2001; Foley, 2004; Warikoo & Carter, 2009).

There are other attempts to describe social forces that affect school achievement, such as ways in which prejudice or stereotyping inside of schools and among school staff may affect minority and low SES student achievement, but these are less cohesive because in general they are not connected to an overarching theory. For example, researchers have separately shown that ethnic or cultural-minority students are often affected by systematically lower expectations expressed by adults around them (Flores, 2007; Peske & Haycock, 2006), may not be referred to advanced classes programs at

proportionate rates as mainstream students (Ford et al., 2008), and may face discrimination in tracking decisions or be negatively affected by cultural factors that arise in tracked classrooms (Ansalone, 2010; Oakes, Joseph, & Muir, 2004). Among peer groups, the existence of negative stereotypes about minority students' abilities or work ethics may also be a barrier to achievement through stereotype threat or other mechanisms (Spencer, Logel, & Davies, 2016; Taylor & Walton, 2011). All of these findings point to issues in school environments and the relationship of mainstream schools to minority students, painting a picture of schools with underlying structures or norms that reinforce racial, ethnic and social status patterns in student achievement. However, they have not been connected to a larger model that can be used to understand school cultures more broadly.

Other scholars approach the problem from the other side, considering how minority or low SES students and communities themselves may experience questions about cultural identity, and the relationship between mainstream culture and their own, that are part of their students' lesser achievement. One way in which these questions have been explored (especially for African Americans, but also Hispanic students) is by considering causes of the so-called "attitude-achievement gap," meaning a measurable difference between how minority culture members describe the importance of education, and how their students actually participate in their schooling (Coleman et al., 1966; Downey, Ainsworth, & Qian, 2009; Kao & Tienda, 1998; Mickelson, 1990). Another line of thinking posits that school underachievement is actually a broad phenomenon, present in every school and more or less affecting every cultural or ethnic group. Students are held to be engaged in meaningful life and cultural choices at each step of their

educations, and based on the environments they are experiencing at the time they make rational choices about whether to participate in school activities or not (Furlong, 1991; Graham, Taylor, & Hudley, 1998; Slee, 2014). For example, students' experiences may lead them to decide that learning (in any specific moment) is of secondary importance to managing stress and resisting schools' attempts to "construct" them as individuals, leading first to lack of engagement and then lower achievement (Furlong, 1991). However, thoughtful inquiries into how students' social environments affect their in-school behavior and learning appear to be somewhat rare.

A large body of literature has considered questions about gender and school performance, including gender and mathematics achievement. In particular, the question of whether girls are as capable of mathematics achievement as boys has roots at least to Fennema's work in the 1970s (e.g., Fennema & Sherman, 1977), with current studies strongly suggesting that there are no measurable differences in male and female mathematics abilities (Hyde, Lindberg, Linn, Ellis, & Williams, 2008), and that differences even in extreme mathematical abilities are unlikely to be biological (Hyde, Mertz, & Schekman, 2009). But gender differences either in overall school achievement, favoring girls (Autor, Figlio, Karbownik, Roth, & Wassermank, 2016; Fortin, Orepoulos, & Phipps, 2015; Heyder & Kessels, 2013), or in some STEM fields, favoring boys (Cheryan, Ziegler, Montoya, & Jiang, 2017; Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012), have been documented, leading to numerous inquiries into the causes of those differences. Ideas that have been explored include stereotype threat (Deemer, Lin, & Soto, 2016; Hartley & Sutton, 2013), conflicts between a feminine school environment and boys' emerging male identities (Heyder & Kessels, 2013), and

girls' lower self-confidence and more negative attitudes in mathematics (Catsambis, 1994; Lubienski, Robinson, Crane, & Ganley, 2013; McGraw, Lubienski, & Struchens, 2006; Hyde, Fennema, Ryan, Frost, & Hopp, 1990). Conflicts between gender identity and school environments may be exaggerated for minority or low SES males in particular (Lundy & Firebaugh, 2005; Mickelson & Greene, 2006), leading to greater gender differences within some disadvantaged populations (Autor et al., 2016). And some authors have found that boys and girls achieve their educational goals at roughly the same rates, but overall higher achievement by girls arises in part because girls set their educational aspirations higher (Fortin et al., 2015; Powers & Wojtkiewicz, 2004; Watt, et al., 2012).

This article describes a qualitative study which explored the various reasons for uneven and inequitable access to high-level academic tracks and mathematics classes at a high-achieving secondary school that served a prosperous mid-sized town. The specific students studied were generally either part of the two advanced tracks on campus (taking AP classes or part of the IB DP program), or concurrent enrollment in community college classes, which was often perceived on campus as a less rigorous or less prestigious option. The intent of the study was to explore ways in which the culture of the school and of some of the many student peer groups in the higher academic tracks combined to affect students' decisions about whether to pursue advanced work on campus, with which programs to engage, and whether to do advanced mathematics work. That is, despite the high school's policy of encouraging minority and low SES students to take advanced paths, this study assumes that student culture and the school environment are the most immediate forces that students experience while part of the campus, and that student

decision-making is to a great extent a product of social currents that exist at a classroom and peer-group level rather than at a policy level.

The Setting

Lakeview High School is a public school of about 1500 students in the Western United States. It is one of four traditional, public high schools serving a mid-sized college town, and its location with respect to downtown means that it draws a diverse group of students. Its white students may live in areas where the college is influential, or in rural communities outside of town where values are more conservative and economic activity is centered around agriculture and energy production. Hispanics form a large minority population, but there also African American and Asian students, as well as smaller clusters of immigrant students from around the world (e.g., Asia, the Middle East, and Africa), who contribute to the cosmopolitan feel in the hallways.

The school offers three distinct options for students hoping to pursue advanced coursework during high school: Advanced Placement (AP), concurrent enrollment in college courses, or International Baccalaureate Diploma Program (IB DP, or when appropriate, simply IB). Of these, the IB DP program is the least well-known, with under a thousand high schools offering the program across the country. Created to prepare children of diplomats with the wide-ranging knowledge needed for the work of international relations, IB DP has very specialized goals and priorities, including fostering character traits like compassion and risk-taking, and academic competences like communication skills, independent thinking and broad general knowledge. As might be expected, multicultural understanding is always an important emphasis. International Baccalaureate program work spans the four years of high school, with students starting in

a preparatory Middle Years Program (MYP) as freshmen and sophomores, and then entering the Diploma Program as juniors. Four years of specific courses in history and English are required, as well as mathematics up to the calculus level, and a class called Theory of Knowledge that emphasizes self-reflection, critical thinking and inquiry into the nature of knowledge itself. Other program elements include a foreign language, classes in the arts, service work outside of school, and a number of essays or projects, as well as a series of summative tests. Participating in IB also involves considerable expenses to the schools offering it (for certifications, required trainings and the like) as well as to students, generally in the form of testing fees, but also for required books, transportation to service opportunities, and other incidental needs. The International Baccalaureate Organization's webpage (www.ibo.org) includes detailed information about the philosophy and requirements of the program.

At Lakeview, in order to be in the IB DP students must commit to the whole program, although the IB Organization also offers certificate options that allow students to take only some IB courses. The choice to offer only the Diploma Program and not a certificate is understood to be important in terms of access and is the subject of ongoing discussion at the school. IB is generally acknowledged to be the most demanding of the available advanced program options at Lakeview, and Lakeview is the only school in the district to host it, so students transfer from all parts of the town to participate. As a consequence, the IB group at Lakeview is large. Each IB cohort is composed of about 70--90 students, with the freshman and sophomore classes at the higher end of this range and the senior class on the lower end. Although the number of students taking at least one AP class is larger, no other cohesive campus group involves as many students.

Other college preparatory programs at Lakeview exist side-by-side with IB, offering a variety of options for high achieving students. Sixteen Advanced Placement (AP) courses are regularly offered, including physics, psychology, statistics and Calculus BC, and AP is acknowledged to be an honors track option. Other students opt for classes that meet concurrent enrollment requirements at a local community college but are offered on Lakeview's campus, and some commute to the community college to take classes during the regular school day. College algebra, for example, is offered on Lakeview's campus in a concurrent enrollment format, while Calculus III is available on the community college campus for students who are ready. A few students take classes at the four-year college in town, with common choices including linear algebra, differential equations or advanced language classes, if they have exhausted the subject offerings both at the high school and community college. In cases of concurrent enrollment, Lakeview generally pays any required tuition while students' families are expected to pay for fees and books.

Efforts to offer rich academic experiences and foster school-within-a-school communities extend beyond the college-bound student groups. For example, Lakeview has created a career pathways program which includes options for five concentrations outside of the IB program: agriculture, business, health services, arts and humanities, and engineering. These options are intended to create opportunities for more "authentic" learning that is relevant to students' career interests, as well as to foster smaller learning communities that support students from all backgrounds. Students choose their pathways as freshman (although a few are assigned to second choices in order to encourage

diversity within the pathways), and can then engage in specific classes and experiences tailored to their career interests throughout their four years.

Mathematics at Lakeview is just as rich in opportunity as suggested by the variety of overall programs offered. Traditional courses are offered from freshman algebra to Calculus BC; as noted above, students who need more advanced work than this can take courses at the community college nearby, or at the four-year college, paid for by Lakeview, so there is no upper limit to the work that prepared students can do. Also, a unique, and popular, geometry course teaches students math in the context of their helping to build a home for Habitat for Humanity; in this class, students split their time between construction and math activities, often drawing connections between the two. Moreover, the IB program has its own mathematics courses, which are theoretically open to any student (although in practice only IB DP students take them). These include Standard Level (SL) Mathematics, which largely covers selected topics in statistics and calculus, and Higher Level (HL) Mathematics, which includes a survey of ideas from areas as diverse as complex analysis, group theory, and discrete mathematics. Both classes are taught in ways that emphasize student reasoning, but the SL class relies more on computational skill, while the HL class demands that students grapple with proof, including proof by induction.

While any Lakeview program is nominally open to any student, and many on the staff are proactive in suggesting that students of all backgrounds attempt advanced course work, its mathematics classes still suffer from considerable de facto segregation by socio-economic status (SES), minority status, and, often, by gender. The district's willingness to advance students in elementary and middle school to more advanced mathematics

learning opportunities means that an "average" entering ninth-grader is assigned to a geometry or Algebra II class, while those who are a little behind relative to their peers take Algebra I. The lower level classes (Algebra I and Geometry, as well as the geometry class that includes building a house) are often majority-minority (Mexican or Central American), whose white students are more likely to be from the rural parts of the district, and mostly male. Higher level classes (more advanced than Algebra II) are disproportionately white, with those white students generally being from in-town, and majority female. The single exception during the period in which this study took place was the IB HL course, which had no rural white students and any minorities were recent immigrants or higher SES in-town families, but its enrollment was about two-thirds male. There were no first or second generation Mexican or Central American students in IB HL Math.

Methods

This study is part of an ethnographic research project examining the culture of advanced mathematics programs, and how this culture affects minority students' access to those programs. Lakeview High School initiated the study because of staff concerns about low minority enrollment in its IB program, and of anecdotally lesser minority achievement in mathematics. However, Lakeview was a strong site choice for this research. It is a well-funded, high-achieving school in which many teachers and staff members have a special commitment to minority education. Therefore, some common factors in minority underachievement (such as unqualified teachers and lower expectations) are not as relevant on Lakeview's campus, highlighting the effects of cultural forces on its students' academic choices. The original study focused on observing

and describing students' interactions with each other and with their environments, and the themes described in this article arose as significant during that process.

The study is based on seven months (about 3/4 of a full school year) of participant observation on Lakeview's campus. Data collected included detailed field notes describing class activities, conversations in the halls, student interactions, environmental factors such as student dress and class layouts, announcements and morning school news videos, and campus environment details like music choices played on school PA systems or in class. Artifacts like handouts used in classes, photos of board work or notes, posters, classrooms and hallway decorations, and teaching displays used by teachers, student work, fliers, and information from the school or district websites, were collected to augment fieldnotes. Observations were also conducted before school, during lunch, after school, and at special events such as dances and graduation activities, in order to have the fullest possible understanding of the school culture.

Interview data comprises twenty-eight formal interviews conducted over the observation period. Interview subjects included key staff in the IB department, counselors, mathematics teachers, alumni and students. The student participants were generally a part of one the advanced programs at Lakeview (either IB or AP). They included male and female students, students of both minority and mainstream backgrounds, and classes from sophomore to senior academic years. Most of the interviews were conducted one-on-one, but a few student interviews were done in groups of two, three or four. Staff interviews tended to last an hour, while student interviews were slightly shorter. All of the formal interviews were fully transcribed and coded. Many informal interviews, including extemporaneous conversations with students and

staff during the normal course of the school day, were not recorded but summarized in field notes.

The interview data collected generally represented the diverse population of Lakeview's advanced mathematics classes well, with a few weaknesses. The proportion of male and female students interviewed was about the same as the gender distribution in Lakeview's IB program, so there are more girls in the sample than boys (about 65%). Indeed, girls followed up with returning consent paperwork and scheduling interviews much more often than boys did, which made it difficult to get a more balanced sample. Also, because there were so few Hispanic students of Mexican or Central American origin in advanced mathematics programs, the interviews for this study overrepresent this population. Finally, most of the students not in the IB or AP programs that were interviewed were either part of the concurrent enrollment program or anticipated being part of it. Therefore, the school's general education population was under-sampled, and observational data among this group was generally corroborated through informal conversations or discussions with teachers or with the students themselves.

Access and the Academic Cultures at Lakeview High School

High schools are places where multiple cultures intersect. Some of these cultures are rooted in the outer community or students' families as ethnic, racial, or religious groups, but others are constructed by school communities, arising within the schools themselves. Familiar examples include the cliques that often form around popular students and athletes, but students can also form social groups on the basis of their shared experiences in rigorous academic tracks, and since Lakeview had two such tracks (IB and AP), it housed at least two distinct advanced academic cultures. A student who chose to

attempt higher mathematics classes was, perforce, also choosing with which of these groups to be associated. The IB and AP students did mix, because most IB students also took AP classes (for example, in mathematics they often took either AP Calculus AB or BC), but in doing so they retained a strong awareness of who was associated with what program, and of cultural differences between the two.

The AP-track students were a larger, more diverse group than the IB DP students, and comprised a less cohesive community. Because they sometimes had only one or two classes specifically designated as AP during their four years at Lakeview, they rarely experienced environments comprised largely of other AP peers. This meant that in some cases AP affiliation was only a small part of some students' school identities, and saying that some students "are AP" was a fairly generic label for a loose group of high achievers on campus. Thus, it made a difference that (in contrast to the IB track) AP courses were offered á la carte, which could be attractive to students who prefer to focus on a few strengths for advanced classes while devoting time to other interests either on or off campus, and this was somewhat indicative of the character of the group. Advanced placement participants could be students who were very focused on specific future goals, like Anna, a junior who had settled on a college major in plant and soil science, and so was taking courses in Lakeview's agriculture and wildlife management track as well as AP math. Or they could be students who chose to pursue more non-academic opportunities in high school and carefully selected only a few advanced courses, like Josh and Matt, athletes from Lakeview's football team who were taking AP Statistics.

One distinguishing attribute of AP students was that they were often united by broad motivational characteristics. Many AP students at Lakeview had friends in IB, or

had heard stories about IB, and specifically decided that they wanted to do advanced work, but with less stress and a smaller workload than possible in IB. Some students among these believed from the outset that by taking AP classes they could do just as well in preparing for college as they would in IB, but more easily, leaving more time for other activities or for friends. Others started high school in MYP classes (intended to prepare them for the IB DP program), but decided that the program was too intense and entered a more general program as sophomores or juniors which included AP courses. There was no single source of stress within the IB program that motivated these decisions. Students changed programs in general because of the overarching stress that they experienced in the MYP program, and because they anticipated the stress to continue or intensify as upperclassmen in IB. Contrary to faculty intuition, the MYP mathematics courses were never cited as a specific, contributing reason for leaving the IB program, or as a reason for not attempting the IB program; instead, students usually felt that either a sophomore-level history class or a chemistry class was the hardest single pre-IB DP class, and said that the cumulative IB workload, and the stress of coping with it, was the determining factor in leaving. These feelings were often amplified by student rumors that claimed the IB program only got harder after sophomore year, although according to most IB DP students the rumors were not necessarily true. In any case, AP students were often those who 1) believed they could get the same results as IB, but with less effort, in AP, or 2) those who wanted to work less and were content to accept lesser results.

Lakeview's IB students, in contrast, generally comprised a very unified group that shared a distinct culture, as well as motivational characteristics. Students often knew one another since attending primary school programs at specific elementary schools in the

area, or pre-IB middle school programs, and they shared the bulk of their high school classes with the same 60 or 70 people. They were also connected to other IB cohorts, both future and past, through siblings and shared teachers, so IB culture was clear, strong, and cohesive. IB students were connected by shared ways of thinking about their learning and their program, shared customs about, for example, how to manage their workloads and how to talk to themselves and others about their experiences, and a very strong collective identity. While any student could take Lakeview's AP classes and join the loose collective there who "are AP," the IB group was not one that students could necessarily gain full access to by simply signing up for classes. Rather, there were nuances in terms of who was in the group, and certainly nuances about who was accepted, and at what level they were accepted, as IB students.

Because of the collective sense of identity conveyed by being in the program, IB students were affected by group norms which they were expected to follow in order to reaffirm their membership. These norms were almost entirely unstated, and sometimes were unrecognized by the students themselves, but were enforced by the same mechanisms as in any social group: by gossip, mild censure, or at times by periods of exclusion. Among those norms, perhaps unsurprisingly, was that IB students were expected to be very intelligent, so that their behavior and participation redounded well on the group as a whole. They were also expected to highly value learning. More surprising was that IB students seemed to be required to maintain a high level of stress, and of busyness, that precluded having time for frivolous antics or pastimes. This unstated norm did not mean that IB students did not participate in sports or other extracurricular activities; on the contrary, they were very engaged on campus and represented in many

areas of school activities, including music, theater, leadership, service organizations, and sports (not as much in contact sports, however, as one student told me wryly). But the expectation was that they did not have time for partying, video games, or leisure of any kind. When asked, IB students generally admitted that their work did not require an equally intense effort through the whole semester, and that the workload ebbed and flowed much as would be expected: at times it could be uncomfortably high when there were tests for which to study or major assignments that were due, but at other times there were breaks in the intensity which brought some relief. However, part of maintaining the IB image involved being constantly stressed, and almost entirely focused on academics and extracurriculars.

The culture of stress in IB is an important issue for the school and staff, because, as mentioned above, the prevailing narrative about stress in the IB program was a barrier to many students' participation. High levels of stress were also of concern to many students, because they had heard rumors about (or known) people who had attempted suicide or self-harm as a result of stress experienced in the program. Some noted deleterious effects of stress in themselves, and as a result often expressed the wish that the staff would intervene more strongly, either by teaching students to cope better or intervening when students ran into trouble. The staff generally viewed high exposure to stress as unavoidable in the program, which is rigorous and highly prescribed. Because of year-end IB tests and the required school authorizations, for example, the teachers administering the program could not make changes that would affect the pace of the presentation of the material or its depth, and because of this many faculty and staff members saw the antecedents of students' stress as being essentially fixed quantities. But

the underlying conditions constituted a background to a student culture which amplified and embraced stress in many cases.

IB students were sometimes very thoughtful in talking about how stress affected them and their peers. While acknowledging the rigors of the program itself, many IB students described the work required for their courses as generally manageable but stated that stress continued to build as they progressed in the program. As a male senior IB student said, "Ah, sophomore (year)'s, a little harder than freshman (year), but not to the extent that you're not prepared for it. Each year you're prepared for it, but you start to get more and more worried about it, I think." College applications, extracurricular activities and students' own very high expectations for their grades and learning were all part of the stress load students felt, but a large part was also the way they communicated the expectation of high stress to one another. A male junior explained, "I'm not sure it's about outdoing each other, but it's about when one student gets very stressed, it's a chain reaction of everybody starts thinking about their stress and fixating on their stress, and it's not a great culture in that sense."

A female junior to whom I spoke (Diana) was even clearer about stating that stress was something that IB students are expected to feel:

It's like self-imposed stress. Like, I think a lot of my problems, or I think honestly, like a lot of problems in IB are problems that we put on ourselves. Like I know sometimes it's like almost a competition to figure out who can stay up the longest doing homework, or who . . . is the most stressed out, who does the most, who is the most stressed out, but still doing well, when it's like we all have the pretty much the same class load, like we, let's all recognize that we all do a bunch of

stuff. They might not be the same things, but we all still have stuff outside of

school so it's not. . . . None of us were just going home and sitting and doing

nothing, like everybody's doing stuff. So.

This student felt that the IB group had a culture that demanded that group members work

enormously hard, and not only that, but, in essence, they needed to constantly

demonstrate how hard they were working by talking about their stress, and enacting their

stress through their behavior. She recognized that this was a group norm, but at the same

time a part of the group's identity, and the identities of the individual members. It went

hand-in-hand with the group's expectations that students take a lot of very hard classes

(often leading students to compare who was taking the most HL courses, for example).

Failing to meet expectations for taking hard classes or enacting stress could result in

judgment or censure, such as gossip, questioning by other group members, and so on. For

example, Diana (quoted above) talked about attempting to head off judgment she

expected to experience because she was planning to take only one HL course in a coming

semester. She did this by adding that she was also taking AP Psychology when talking to

her peers about her plans. Even as she did so, she struggled with the feeling that those

efforts should not be necessary, and her choices should be accepted by the group without

explanation.

If stress and the high workload were the biggest reasons that some very bright

students at Lakeview chose not to enter the IB program, perceived elitism and

competitiveness in the program were a close second and third. The charge of elitism was

generally vigorously denied by IB students. However, when defending themselves

against this accusation, several students expressed their point of view with examples that

in fact suggested elitism. For example, a female junior (Anna) who had dropped out of IB after her sophomore year stated that:

> I would not say that the general majority of those people (in IB) will think that they are better than the average Lakeview student. I do believe that they think that they work harder . . . I think that they, um, probably feel . . . I know that I felt this way sophomore year, that I was putting so much more work into my education than a lot of Lakeview students, and when people would be in the hallways talking about like, I don't know, drugs or something, and like, parties, I'd be like, "what are you doing?" You know? So, in that way I felt like I was handling my life and my education a little bit better, but I don't think that I'm personally a better person than them. Do you know what I mean? Yeah.

International Baccalaureate students did indeed look down on the general education students at times, for a number of things: for example, not working hard enough at their educations, being frivolous or immature, for not being as intelligent, or for holding conservative political views. In turn, the other students defended themselves and invalidated IB students' opinions through leveling accusations of elitism. It is true that the IB students did not want to be elitist, or at least did not want to be perceived that way. They were troubled that elitism was part of their reputation. However, their conception of what it means to be elitist (like their understanding of what it means to be inclusive) lacked nuance and prevented them from honestly appraising this part of their image. This should not be construed as a harsh reflection on these students, who (however bright and engaging) were also very young, and who were commenting offhand about weighty interpersonal issues that evolve for many people throughout their lives.

The students were trying to apply the lessons in diversity and self-reflection that are an important part of MYP and IB DP, but did not completely understand their implications.

Competitiveness in the IB program is acknowledged by IB students to varying levels. The extent to which a student experiences it differs according to what "friend group" a student associates and to what his or her own desire for competition is. The spectrum ranges from seeing the whole program as an honorable battle with students locked in combat for rankings within the group to admitting that the program is sometimes competitive, but usually feeling competitiveness is moderate and helpful. Most IB students seemed to value the competition, feeling that it provided motivation to work harder and improved learning, but a few struggled with this aspect of the program, and wished that the culture was more collaborative. One female student expressed some of this tension in her comments, and also was aware that the competitiveness impacted social situations on occasion:

Interviewer: . . . can (people) really feel comfortable saying "I just don't play that game" (and choose not to compete)?

Leila: Yeah. Because that's the way that I am, I'm just like, you know, I just want an A, like I don't care how I get it as long as I get the A. I don't want you to NOT get an A. So um, there is, there are the people that are just like, you can chill with. And, like, if you're friends with the competitive people, sometimes they can be nicer to you. To be honest.

Interviewer: So now, being honest, sometimes they're not nice then.

Leila: Yeah. That's okay. It's just like outside of school they're very loving people.

International Baccalaureate students' competitiveness was sometimes problematic for the adults around them, who had a goal of improving diversity in the program and opening it up to minority students that were often less well prepared than an average student in the program. Competitiveness was a deterrent to attempting the program for exactly those populations, and was an aspect of the IB community that they often found troubling. The IB students claimed that competing was so ingrained as part of their culture that nothing could be done to stop it, but it did seem that the competitive environment was in part a result of a lack of attention by teachers and staff, who made inconsistent efforts to rein it in. Students attested, for example, that they were told once or twice in a semester that they were not supposed to share their grades with each other, but that this message in itself was not sufficient to keep them from doing so.

Some teachers' policies also had secondary effects that strengthened competition, like a science teacher who gave very difficult tests but then graded them on huge curves based on student scores; in this case there was an incentive for each student to specifically wish for their classmates to do badly on a test, and this increased competitiveness. In contrast, however, an alumna (Anja) described a strong difference between two Lakeview sciences that she took: an AP Physics class (which she felt was very competitive) and an IB SL Physics class (which she characterized as very collaborative). She attributed the difference in class culture largely to the SL Physics teacher's having been careful to cultivate a supportive class atmosphere. For example, the teacher had partnered students strategically so that those who were struggling had support

in classwork from the stronger students and framed the work in her class as a team effort. "There was the idea that everyone in the class was really (working together), as opposed to, you were solely responsible for it," explained Anja. So, competitiveness might not have been as intractable a habit in IB as students insisted.

One way that IB students coped with the stress and workload of their program was through a strong system of "friend groups" (a term used by both students and staff at the school). In essence, the 60 to 70 students in any given IB cohort could be thought of as part of interlinking, smaller circles of four to seven or so students who had very strong social bonds, and who were each other's main academic supports. The help they gave one another could be direct (for example, the group might split up questions on an English assignment and pool the results to save individual work time), or indirect, in the sense that members of a friend group provided emotional support to one another that no one else could, as they shared the same work and experienced the same worries. At their best, friend groups functioned as heterogenous study and support groups like teachers might create in class to promote cooperative learning, but with these specific groups taking on the entire program together, meeting out of school at homes or coffee shops or during free periods at school to tackle the program's challenges one by one. The students repeatedly told me that their friend groups were crucial to their ability to function within the IB environment, often commenting that they "couldn't do it without them," or a similar statement.

But friend groups were not equally helpful to all students. Groups often formed before the members were part of Lakeview's campus at all; it was not unusual for a student to tell me that their friend group had been together since middle or even

elementary school. This made it more likely, for example, for students from privileged

neighborhoods to work together throughout the high school years. Some students said

that there was movement among friend groups, but it seemed that only a small proportion

of IB students switched groups at some point, and that relative stability was the general

rule. This could have made it difficult for some individual students, especially those with

more diverse backgrounds, to gain a foothold in the program, especially since IB

students' understanding of inclusion was often based on more superficial interactions. For

example, when asked if anyone could join the IB program as an equal, a female

sophomore replied, "Yes, people will talk to them." The support needed for a student to

succeed, of course, runs much deeper than simply conversing with them.

Although cohorts of minority students (most visibly, groups of Latinas) did

attempt the program together, they often became de facto their own friend group and

study support, keeping to themselves. Because these Hispanic students typically had less

preparation for the program than average, these homogenous groups could lack the depth

to give the help available in other groups. A junior to whom I spoke suggested that the IB

department itself might attempt to create study groups, because

> Leila: . . . I know for us our study groups are basically just like our friend
>
> groups and so I'm like, for the Hispanic people who like feel like
>
> they might be at a lower level, it can be harder to like make study
>
> groups because if they do make a study group they don't have
>
> necessarily the help they need.

> Interviewer: They don't have the mix.

> Leila: Yeah, exactly.

Friend groups were a structure that tended to distribute important resources in unequal ways and were part of the problem of program retention and completion for less advantaged students.

The IB program stresses multicultural education, and perhaps because of this the students in IB (while not visibly very diverse themselves) were accepting of many kinds of diversity, although not all kinds. For example, one student said that as a person who was questioning their sexual identity, the IB program felt like a safe haven on campus. Immigrants, as long as they were not from Central America and Mexico, also may have been readily accepted. For example, a new student from India was admitted as a junior into the IB program during this study, and students' claims that he was immediately admitted to the group were corroborated by many observations of his chatting easily with other students in class, and, in fact, seemingly a hub of talk and activity. But the immigrant students who were part of the core IB group had some advantages that might have been part of these students' success. They were all from middle-class families, or at least families that specifically aspired to being middle class and had adopted American mainstream values. They were all clearly highly intelligent and were not just successful in their courses, but very successful, so conformed closely to IB students' images of themselves. Finally, and not least, they were attractive and confident, seemingly by nature, so with a clear charisma.

It is clearly true at this school that not all immigrants have these advantages, and not all minority students who attempt the IB program were able to win firm standing in the group. The only Mexican and Central American students in the IB program were a cohort of five Latina girls who told me they struggled with acceptance. Again, these

claims were corroborated by observations of these Latina IB students comprising their

own subset within IB classes, usually sitting together and holding themselves apart from

the others. Other students also confirmed the impression of these girls' separateness in

interviews. The reasons why a student from Brazil, for example, might find easier

acceptance in the program than one who was born in Juarez, Mexico, but raised in the US

(and indeed raised in the town that Lakeview serves) are complicated. Certainly part of

the problem was that Hispanic students from Mexico and Central America who were

educated in Lakeview's district already had considerable contact with a system which

often assumed that they were less teachable, and a social setting in which they were

somewhat marginalized, so their position when they entered the IB program may in part

have been a reflection of what everybody expected. But they were also held in place by

other factors, including usually coming from lower SES backgrounds, having a distinct

culture that they did not intend to set aside, and the fact that prejudice against their

specific Hispanic group was somehow particularly entrenched in Lakeview's greater

community.

There were other Latina students of similar background at Lakeview, not in the IB

program, who appeared to be happier and more confident than the Latinas in IB, and who

said that they felt fully accepted in their chosen programs. Some were in high academic

tracks; one was in an AP Calculus BC class. But there were two differences between

these groups that might help to account for their contrasting experiences. One was that

the successful, happy Latina students appeared to be relatively insensitive to negative

judgments made by their peers, shrugging these off when questioned about them, and

indeed recalling few incidents. They had experienced discrimination or negative

comments, but these had not made much of an impact on them. Instead they experienced Lakeview as being an open and welcoming environment where they had few difficulties, which made it possible for them to be open and outgoing. In contrast, the IB students were very sensitive to prejudice that they experienced, and because of that they took a more defensive posture in class and in interactions with the other students. This appeared to contribute to a feedback cycle which emphasized these girls' otherness and made negative experiences with their peers more likely.

The climate of the IB student community itself, however, was sometimes problematic for its Latina cohort. Some aspects of the IB culture, such as a focus on individual achievement and competitiveness, were polar opposites of norms in the Latina students' home cultures, for example, and this contributed to the Latinas' being less comfortable with the IB environment than most other students were. Creating their own subculture which was more cooperative and collaborative addressed one problem while triggering another: it reinforced the girls' separateness from the larger group and emphasized otherness. At the same time, it also appeared to be true that the Latina students had trouble establishing their own identities as lovers of learning, and as being hard-working and intelligent, as demanded for IB group membership. The result was that they experienced some of the negative aspects of the school's IB community more keenly (judgment and stress) while at the same time not having access to its more positive, supportive aspects, like being a part of a larger community which offers encouragement and reaffirmation, especially by validating the worth of the IB experience as a whole.

The Latina girls in IB believed that many of the negative perceptions they suffered from, and the resulting isolation that they experienced, were the result of

prejudices among their IB peers, and to a lesser extent because of social disadvantage stemming from their families' lack of education and financial resources. Specifically, they claimed that there were many double standards in how their behaviors were perceived, as opposed to how those same behaviors would be seen in another IB student. As an example (which seemed to arise from an actual experience), they suggested that if most IB students arrived for a presentation and were underprepared their classmates would assume they had had too much to do the night before, but if one of the Latina girls was underprepared, it was taken as an indication that she did not care about her education enough. They also described believing that they were perceived as less intelligent, relating stories of their peers' expressing surprise if they got a good grade on an assignment, or giving condescending or insensitive peer reviews on work they had done, among other instances. Given the extreme importance of the perception of intelligence and commitment in the IB group's collective identity, these girls' difficulties establishing these kinds of public competences could make it impossible to win real acceptance. It complicated matters that some of the Latina students were, in fact, less well prepared for the program than average, having come to Lakeview from less advantaged middle and primary school programs, for example. While being less prepared is not indicative of either less intelligence or less love of learning, it along with underlying prejudices might be enough to lend the appearance of confirmation to judgments by other students.

Lakeview IB students' culture guided classroom interactions and norms as well as behavior and interactions among students, and IB students had strong opinions about their learning environment. Upper level IB and AP classes at Lakeview might have looked similar to a casual observer, but IB students insisted that there was a difference,

and this could be discerned with careful attention. In both kinds of classes students had intervals that could seem loud and exuberant; in both, the class generally settled and paid close attention to teacher presentations. But IB students often felt that time was more productively used in IB classes, that talk was more focused on learning, and that teachers were more respected. Indeed, they were often fiercely protective of their class culture, and they said that they did not want their teachers to have to deal with distracted or uncommitted students. They also said that the style of learning and the content was different, especially in that it was more reflective and deeper. As Alexa said:

> When someone asks me, like, "What's IB to you?" I say, "It's a different way of learning for me that's more in depth." Like, I've been told like AP, it's like you skim the surface of a lot of things. IB, you take a couple of those things and go really in depth. And so that's how I like to define my learning.

Alexa had been in both AP and IB classes, so she was making this comparison from direct experience. But it was typical that she struggled to explain the difference between IB and AP without reverting (as Alexa herself noted earlier in her statement) to just saying that "it's harder." IB is certainly harder, but as its website states, its curriculum also arises from a philosophy that students should become "knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced and reflective" (www.ibo.org). Students write more, they create more arguments that they must defend from commonly held facts, and they become independent in their learning in ways that AP students may not.

This philosophy also makes IB mathematics classes different from their AP counterparts. The topics covered are selected less conventionally, so that there are no

easy ways to draw equivalences between an SL class, for example, and another typical class at either high school or college level. From the point of view of simply getting as much college credit as possible AP classes clearly offer more opportunities. But as in other subject areas, IB mathematics classes are designed with different goals and produce different results. Anja, at the time a graduate student in a highly-regarded engineering program, emphasized the importance of IB's having encouraged her to write in mathematics classes, saying

> I see my colleagues now in electrical engineering . . . a lot of people don't know how to communicate their ideas, and I think IB does an excellent job of preparing you for that. I think it was three written papers that we had to submit. . . . It was the first time that I wrote a technical paper. I think you normally don't get any exposure to this in high school at all.

But the greater emphasis on proof in an HL class is also very different from the more computational approach of AP, while the topics chosen for the HL and SL classes are intended to offer a broad overview of key fields rather than focus on topics typically included in freshman-level college classes. It is arguable that a student who intended to major in mathematics or a scientific field in college would be better served taking an IB HL course rather than AP Calculus, because the early exposure to proofs and the broader view of mathematics as a topic obtained would contribute more to the skills and mindset important to success on that path. However, in practice a mathematically-minded IB student would likely do both.

Lakeview's situation is different than most high schools because it has two advanced programs; in part these have defined themselves in terms of the other. That is,

IB students have as part of their identities that they "are not AP." And the presence of two high-achieving groups on campus may change the dynamics of membership. It might be true, for example, that some of the characteristics that IB students claim for themselves at Lakeview might belong to an AP group at another school, especially those based on being in the most advanced, hardest-working group on campus. Because of this Lakeview's IB culture may illustrate social dynamics that are common to elite student groups, and hence which must be considered in order to make advanced programs accessible to less privileged students.

Mathematics Achievement and Gender Culture

As previously noted, there was a consistent and noticeable disproportion in the number of male and female students Lakeview's math classes (the number of males was greater at the lower levels, but there were more females at higher levels, starting in about Algebra 2). Each of Lakeview's various populations--"mainstream" in-town white students, Hispanic students, immigrant students, and white students from rural or farm and ranch homes--is affected by the same pattern, but not to the same degree: gender disproportions were stronger among ethnic or cultural minority populations, such as the Hispanics and rural whites, than among in-town whites and immigrants. Disproportions also appear to be greater among low SES white students. Only one advanced class, the IB HL class, had a composition that did not reflect the trend, with about 60% males out of 13 students. That exception will be described later, because its culture also contrasted strongly with most of the other mathematics classrooms at the school, making it a unique case.

Besides the patterns in school participation that were apparent by counting male and female students, gendered behavior also varied depending on the level of the class observed. Students' behavior tended to be more strongly masculine or feminine in the lower level classes, and the least differentiated in higher level IB classes. 'Male behaviors' in this context means activities including roughhousing, shouting across the room, throwing things, wearing strongly gendered clothing like muscle shirts or pants cinched at or below the hips, flirting, or persistently playing video games (on either a computer or cell phone) during class, provided that those activities appeared to have a purpose as a way of symbolizing, signaling, or self-reinforcing gender identity. 'Female behaviors' means applying makeup or looking in a mirror, giggling loudly or persistently while talking to a friend, wearing gendered clothing like high heels and tight or revealing pants and tops, or flirting, as examples, with the same proviso that (at least in part) the purpose of these activities appears to be to convey gender and identity signals.

To varying degrees, most of these gendered behaviors appeared to disrupt or undermine classroom attention and activities. Male behaviors were more distracting than female behaviors in general because they were louder, bigger and more likely to capture the attention of both students and teacher; in fact, sitting quietly in class could almost qualify as a female behavior. Especially at lower levels and among minority students, boys often seemed to come into class with a point to make, and that point was incompatible with learning the subject. Miguel, a Mexican-American, was an extreme case of this. As a sophomore in a general education geometry class his usual class routine involved an impressive range of behaviors that seemed to have the express purpose of creating a barrier between him and the content that was being discussed. When required

to sit still during a lesson he did so, but without paying attention, writing any lecture notes, or attempting to solve a problem. When asked to try examples he would instead open a computer and share videos or images with friends, socialize with a ring or four or five of his peers (determinedly distracting them with jokes or conversation when they showed the intention of picking up a pencil), or leave the room on a bathroom break. Despite his behavior, however, his teacher reported that he always had his homework completed and maintained a C average in the class (although a number of the other boys in his circle did not). Miguel's grade was not a source of satisfaction to his teacher, who once confessed that she "had no idea what he knew," because she could not confirm that he did his own homework, and because he took his tests in the ELL room where she could not watch him do his work. It perhaps adds to this picture to note that the next semester, when Miguel's Algebra 2 teacher was less tolerant of his coping mechanisms, he compensated by rarely going to class at all.

Miguel's geometry teacher was plainly baffled by him and by how to handle him. She saw no good options that would shield him from distraction, because she believed that the source of the distraction was his own determination not to do math in class. The message he was sending by his jocular conversations with male friends, his flirting and his many interludes out of class appeared to be: I am too manly to need to learn math. The obvious question was whether there was something about the school environment that triggered Miguel's need to constantly reaffirm his masculine identity and his relentless dissociation with the class itself, but there was no easy answer. Like most of Lakeview's geometry classes, Miguel's was majority-male and had a large proportion of Hispanic students (including girls as well as boys), which might have been factors in his

feeling more comfortable, rather than less. Important factors may have included the mainstream classroom setting itself (because it required sitting quietly and obedience), confronting content material which was difficult, or the guidance of a female teacher. And these difficulties may have been exacerbated in Miguel's case because of gendered cultural expectations.

Of course, Miguel was an extreme case, but strongly illustrative. Especially in the more basic classes (like geometry), it was common that boys' sense of gender identity seemed to be in conflict with classroom norms and expectations, and that many boys in these settings often felt compelled to tilt the balance by acting out to reassert their masculine identities, or with dissociative behaviors (like slouching low in their desks behind a computer). As with Miguel, it seemed to make every difference whether the work that they did was public, especially in the presence of peers, or in private, and it was not necessarily associated with low achievement. For example, a similar dynamic occurred in an AVID (Advancement Via Individual Determination) class, which was intended to "untrack" at-risk, but high potential, students and to prepare them for college. In that classroom a cohort of Hispanic males generally resisted doing any useful work during class time (preferring to flirt with girls or engage in jokes and horseplay), although they were taking community college classes and had committed to a college preparatory track. In another geometry class, two white boys sat at the back of the class, persistently playing video games on their laptops, while a group of Hispanic boys sat with friends in a corner and spent as much of their time as possible on social activities. In an AP Statistics class, a group of white, male athletes focused their class time on one another (talking about activities such as weight-lifting, as I learned from a female student who sat near

them) rather than on the class content. The exceptions, meaning classrooms in which male behavior that was obviously contrary to learning goals was not often in evidence, included the specific geometry courses that included building activities, the IB courses, and some of the higher math classes such as AP Calculus BC.

Female behavior can be distracting and contrary to the learning process, but generally did not impact classrooms overall in the same way that male behavior did. With some exceptions, girls seemed able to meet behavioral requirements of the school without feeling that doing so conflicted with their basic identities. Instead, the girls who chose to underperform in their math classes did so because they felt the content was irrelevant to their futures, and thus unworthy of much time and attention. For example, two Hispanic girls (Araceli and Michaela) were one of the prominent examples of female disengagement. They were best friends who sat together in a geometry class, more or less following along with the work, but often allowing their social interactions, such as sharing music on a phone (by each using one of a pair of earbuds), looking for music videos on YouTube together, or texting friends, to be a priority. However, one of them considered math to be her favorite subject and said that, in particular, she liked her geometry class very much. She was far from fully engaged in the class, which she had decided "wasn't really important" to her future. Girls' forms of opting out were usually less obvious than boys', and girls seemed more able to do enough work to pass a class despite its perceived irrelevance.

Gender norms were strikingly different among the highest-performing Lakeview students, the IB DP students. Among them gender expression was relatively muted, so that gender identity itself took more of a background role in the classroom culture.

Gendered behaviors, like roughhousing among the boys, were rare, and students'
personal choices of clothing or school accessories like backpacks (which could often
signal identity or affiliation at Lakeview) often tended to reflect a norm that called for
utilitarian, fairly uniform styles. In clothing this meant that tennis shoes, jeans, hoodies
and tees that were worn by both genders, with simple hairdos and little makeup for the
girls. Simple girls' clothing like sandals or a basic dress conformed to this norm well
enough, but more coordinated outfits or flirtatious clothes did not. The purpose of this
norm was not to reduce gender expression, but to reflect the group's IB identity and
image as serious and stressed students who put schoolwork first. Girls, in particular, who
spent more time on their appearance and chose more feminine styles may have been
criticized for these choices, not because they looked more feminine, but because their
appearance suggested that they have time for trivial things like clothes, rather than being
constantly and urgently occupied with schoolwork and activities.

The fact that IB students spent less time and effort in gender behaviors did not
decrease the liveliness of their classrooms, it just meant that boys and girls were likely to
be doing similar things. Students chatted with one another, but their talking rarely had the
attention-drawing qualities of conversations in which gender expression was part of the
point. Both boys and girls would sometimes quietly "check out" by watching videos on
their computers, and both worked in groups (usually mixed-gender groups) to complete
assignments. The lack of stereotypical gender behavior was one of many factors that
makes IB classes different from others on campus and was part of the IB culture of which
students were so protective. They repeatedly said that they wanted the focus of their
classes to be on learning, and they valued the academic atmosphere they created in those

classes. Giving up some forms of gender expression was a price they paid for being in IB (along with many social aspects of high school, like parties and "hanging out"), but one which they did not find onerous, when indeed they recognized it at all. One unexpected aspect to the gender cultures of advanced students' families (including IB) that seemed to be echoed in school culture as well was a great awareness of societal gender inequalities that would confront girls, and a strong message that despite this, girls were considered strong enough to overcome them. In fact, girls were expected to overcome them, and many of the female students talked about feeling empowered by this juxtaposition of definite (but not unconquerable) social barriers, and high expectations. A female sophomore in the MYP program, which leads to IB DP, described her feelings by saying:

> Laura: I think just with girls, like, I know especially now we're just trying to break those stereotypes where, like, girls can't do anything. Girls, like, are only, they only work for like housewives and like, um . . .
>
> Interviewer: Do you really feel those stereotypes that . . . have people tried to impose those on you?
>
> Laura: No. But I feel like that's the reason we're pushing ourselves more, because we're like, we have so many talks. We have so many people come in and be like, we have so many presentations on like empowering women, empowering girls. And like we've seen so many news stories that we're like, we want to do that, we want to do better. So, I feel like that's pushing girls. With guys, there's not

really a motive to be better, because they're already at the top, I guess.

Girls, then, had additional motives and expectations that lent urgency and seriousness to their school experience, and indeed seemed to be 'riding a wave' of pro-female, pro-education energy. This generally had no analog among the boys, who in fact spoke of themselves as naturally being less mature than girls at their ages, and of boys' choices to prioritize athletic and social aspects of school, or having just fun over academics, as normal. This study, however, provided no evidence for lesser maturity among boys, but strongly suggested that family and social messages either "went easier" on boys in the case of White, mainstream students, leading boys to choose less challenging academic experiences, or alternatively that gender expression was very important among some cultural-minority boys (such as Hispanics and rural Whites), while at the same time not associating maleness with in-school behaviors that lead to success, or with educational achievement. Under these circumstances, disproportions in girls' and boys' academic success are to be expected and continuing these conditions may well continue or increase existing disparities.

There were two pointed exceptions to the gender norms in mathematics classes on campus, and those occurred in the geometry sections which involved building activities, and in arguably the most advanced mathematics class offered on campus, the IB Mathematics HL. Both of these classes were exceptions because their cultures actually more closely resembled old gender stereotypes about math than anywhere else in the building. Considering these classes is important, in one case because it provides an example of how a class format can be used to ease gender limitations and offer

opportunities to highly gender-conscious boys, and in the other case because it suggests ways in which the remnants of gender stereotypes disempowering girls may still be important and having an effect.

Lakeview is on a block period schedule, and the two geometry sections which also built a house were assigned double blocks twice a week to accommodate extra time needed for both building and math activities. They were housed in trailers away from the main building, next to the building site, which was surrounded by moveable sections of chain-link fence that was hung with hard hat warnings. Inside the trailer the actual hard hats were housed to the right of the door in racks, along with tool belts and work gloves for which students shopped along with the rest of their school supplies. On the right was a classroom, a big one that accommodated large classes of more than 30 students. Tables were arranged for group work, and when the students were in the trailer the room was crowded and electric, bustling with activity. There were always two adults (both white men) in the class, one the geometry teacher (Mr. Tailor), and the other an assistant who represented Habitat for Humanity (Mr. Davis) and guided the building activities as well as some classroom activities that were aimed at life skills and character development. The teamwork in developing and presenting the class was refined and effective.

A large majority of the students in this class were male, and the course was set up to accommodate the needs of lower SES, cultural minority boys, including both Mexican and Central Americans and Whites with farm and ranch backgrounds. These students found male mentors in the teachers, a classroom culture in which male behavior was expected (and generally channeled or ignored rather than discouraged), and a variety of activities which allowed students to get up, move their bodies, and "blow off some

steam." Occasionally during the semester, the math teacher explained, the weather was bad enough that the students needed to spend the whole class time inside, and those were hard days for everyone. In better weather, even if no actual building activities were possible, the students could be sent to work outside, as a way of creating spurts of physical activity that make the geometry lessons more palatable. For example, one day it had snowed about five inches the previous night, and it was decided that no construction work could be done. However, about half-way through a class on circles the students were told to grab their coats and gloves and were sent outside to move wet snow off of the lumber piles. The students trooped out to get the job done, using pieces of board or brooms and working in small teams, and when the job was done, they were glad to be inside again, and ready to keep learning.

The geometry sections described here were success story for Lakeview. They were populated by students who often had particular issues that made their progress in school, and perhaps particularly in math, more fragile. These students found a place where the classroom culture was consonant with aspects of their identities that might be implicitly challenged by prevailing norms in other school settings. In particular, this course honored traditional male stereotypes, and provided a way in which students for whom male differentiation was important to their identities could function well. Perhaps surprisingly, although female students were a minority in the class and although the male culture was pronounced, the girls who enrolled in the class also, frequently, had strongly positive experiences. They often cited the physical activity as being helpful to them as well, and (perhaps again because they expected to have to succeed in somewhat

disadvantaged circumstances) the girls who chose to take these geometry sections were not troubled by the very traditional male culture they encountered there.

The IB HL math class was, of course, almost entirely different in feel and content, but is another setting in which traditional gender roles had surprising prominence. Mr. Tailor, the math teacher for the special geometry sections, also taught the IB HL. In fact, he piloted the special geometry course at Lakeview, perhaps making it less surprising that he was also willing to take on the math HL, which was full of bright students and difficult material. The course takes on topics as diverse as complex analysis and group theory, requires the students to grapple with proof-building and covers these topics at an IB pace. A confident teacher is a must. And Mr. Tailor's highly people-oriented and energetic style, and his particularly offbeat sense of humor (shared liberally with the students), was an important part of both environments.

During this study the class generally included 5 girls and 11 boys, reversing a ratio seen in most of the more advanced mathematics classes at Lakeview. This made the setting more similar to stereotypical advanced mathematics classes, in which it would be expected that the teacher was male, and the students would be mostly male. The students sat in two sets of rows that faced the middle of the room (and each other) rather than the front, with an aisle in between that Mr. Tailor used to move between a SmartBoard display on one side and a wall of whiteboards on the other. All of the male students sat on one side, facing the door, but most of the female students preferred to sit on the other side, in a loose cluster.

The presentation of the class was not traditional. Mr. Tailor taught interactively, keeping any lectures fairly short, and often having students come to the board to work out

problems with his coaching or other students' support. This coaching attention was offered to girls, if anything, proportionally more than to boys, and there appeared to be no gender differences in the exchanges between students and teacher, which tended to emphasize perseverance and courage in the face of difficult problems. Mr. Tailor's tone in interacting with the students was always warm, energetic, and often humorous, even when encouraging a student to work on a problem which was clearly uncomfortable for them. One of the often-geeky running jokes in class was remembered fondly by an alumna:

> Whoa, yeah, Mr. Tailor! Yeah. He's awesome. He always creates, ah, these ridiculous words to write at the bottom of a proof. I don't know if he still does that. (Laughs.) We would prove something and then we'd all, uh, have to make up a word that we wrote at the end of the proof that was like, I think his was "shabam" or something like that. We were supposed to, when we proved something, write out that word and, you know, yell it out. . . . That was the best part of math class. (Laughs.)

The IB students deeply appreciated most of their teachers, and Mr. Tailor was certainly among them. Even so, however, something about the class seemed to reinforce gender stereotypes among some of the female students. The HL classroom was the only one on campus in which girls made repeated and deeply-felt statements about a lack of confidence in themselves and their ability to solve problems. The boys did not do this. The girls were unable to pinpoint a reason for their lack of comfort, generally just noting that the material was hard, but Mr. Tailor said that the girls in general performed as well as the boys in the class. This suggests that the material is not harder for females than

males. Instead, it may have been that in this class conditions like the higher proportion of male students, and the class' status as the hardest math class on campus, triggered stereotype threat for many of the female students. Mr. Tailor repeatedly talked about how it was alright to not know how to do a problem, or to do a problem incorrectly, but was unable to create a culture in which this was true for some of the girls he was teaching. Girls at Lakeview had claimed space for themselves in almost every classroom on campus and had feminized academic achievement in their minds; that is, achievement was framed as appropriate for girls. This class alone among the mathematics offerings suggested that a gender dissonance still existed in some cases. In an interesting twist, however, the gender composition of the class was reversed the next year (after the completion of data collection for this study); the class consisted of 5 boys and 10 girls, suggesting cultural changes that continue to expand girls' academic opportunities. It is not known whether the gender norms of the class changed when it became majority female.

The school staff at Lakeview were often passionate about promoting equity in the higher-level classes at the school, generally focusing their efforts on Mexican- and Central American-heritage students, a visible and significant minority at the school, and lower SES students of any background. However, gender disparities were unaddressed in any broad and visible way, except by a general culture of encouraging individual students to reach higher and further in the courses that they attempt. This observation is not intended as a criticism; rather, conversations with staff and students consistently suggested that the gender disparities had been observed and discussed, but that only tentative understandings of their impact and sources had emerged. In this climate, no one

was certain what could or should be done to address conditions that were not necessarily recognized to be a problem. Indeed, in some cases there seemed to be a kind of cognitive dissonance in the face of high female performance, male underperformance, and common stereotypes that reflect traditional male privilege. As a female student (Diana) stated when asked her thoughts about the gender disparity in her IB SL class:

> Gosh, I . . . that one always blows my mind too, becau . . . I've always been confused by stereotypes, sometimes, because there's the idea that men are smarter than women. I mean, I don't really believe that, but there is that stereotype definitely out there in some places. But then it's also, I'm, that's like kind of butting heads with 80% of our class is females. But I, I'm not sure if it's necessarily because . . . hmm, gosh, this is a hard one.

Staff members who were fully aware that males are not actually better at math than females still seemed to have confidence that, in general, school environments favored males (as indeed they might have), and so to believe that equity efforts on behalf of boys might be inappropriate. In contrast, societal inequities experienced by females seemed relatively concrete: women still faced systematic disadvantages in terms of pay parity, advancement opportunities and representation in leadership positions, for example. Moreover, as one teacher told me, although on reflection her chemistry class was indeed majority female, she felt that if anything the willingness of her male students to be vocal in class made the atmosphere of the class feel more masculine than feminine to her. Perhaps in response to these societal realities and social dynamics within the school female students were commonly encouraged and supported as a group, but male students did seem to receive the same level of collective attention.

Gender was a very important issue in students' mathematics achievement at Lakeview. Minority and low SES students were typically affected more strongly by gendered expectations of their in-class behavior, and boys were more affected than girls, but in general the need to express gender norms as part of a student's public identity appeared to have a dampening effect on mathematics achievement in traditional classroom settings. Often, girls were aware of negative stereotypes about female achievement in mathematics but were enveloped in a culture in which they were encouraged to confront and overcome the barriers that the stereotypes and traditional cultural norms presented. This dichotomy in which girls expected unequal opportunity, but were encouraged to overcome it through hard work, actually enhanced their efforts and produced higher achievement. Indeed, girls were often aware of a collective energy that encouraged them to accept challenges and supported their academic work, and were aware that girls around them were succeeding in similar pursuits, making those challenges appear superable. In part these factors explain Lakeview staff's observations that minority and low SES girls were more likely to strive towards advanced coursework than boys. On the other hand, boys at Lakeview lacked the advantage of a similarly motivating societal message. Rather, the messages that they did hear, such as the theory that girls matured more quickly than boys, often provided excuses to make less effort, and as classrooms become more feminine environments, they found more challenges to their identities as men. The result was that often boys made choices to try a bit less hard, to spend more time on social pursuits, such as sports or video games, and, in general, to identify with things other than school achievement (even in mathematics). Countering these trends in boys is an important part of access and equity in schools and will enhance

equity efforts that are focused on at-risk groups like cultural minorities and low SES

students.

Conclusions and Implications

This study suggests that student culture strongly affects some well-prepared

students' choices of track and their decisions about which kinds of advanced coursework

to do, or whether to do them at all, and so impacts their access to academic opportunities.

The IB program, in particular, was an important factor in students' social dynamics at

Lakeview, and entering that program meant assuming a kind of collective identity that

had both positive and negative aspects: intelligent but elitist, hard-working but under

enormous pressure, liberal-thinking but privileged, sometimes intolerant, and (in the eyes

of their general education peers) out of touch. Both because of the potency of the IB

brand on campus and the time commitment required to be in the IB program, it was

difficult for students in IB to also maintain relationships with other groups, and this was a

factor in some students' choices of whether to attempt the program or not. For Hispanic

students, who also had difficulties being fully accepted in the IB program, the choice to

enter IB could mean accepting relative isolation, and working under conditions in which

some of the aspects of IB program culture that were usually supportive (such as the help

generally offered by a strong friend group) were muted, but feeling the full weight of

negative aspects (such as high stress levels and negative perceptions from general

education students). The stereotyping and biases that some minority IB students felt was

common within the IB group was another burden and affected only themselves. Staff at

Lakeview had observed that Hispanic students tended to attempt the IB program in cohort

groups, and the social conditions which minority students could expect to experience in IB make this pattern understandable.

This study neither supports nor refutes Ogbu's cultural-ecological theory (Fordham & Ogbu, 1986). While in general Ogbu's characterizations of immigrant groups did seem to have predictive power, achievement also appeared to be predicted just as well by considering SES and was strongly influenced by gender (a factor that Ogbu did not consider). The "voluntary" immigrants who were doing well in my sample were highly motivated, often experiencing a strong family culture that emphasized working hard in order to achieve the American dream but were also either middle class or aspiring to be middle class. "Involuntary" immigrants, such as Hispanic students, generally had lower achievement, but often the source, as related by students, was in aspects of Hispanic culture or family expectations that students were embracing (such as an emphasis on contributing to family expenses or care early, or the expectation on early marriage) rather than a resistance to assimilating into a mainstream American culture, influences that Kao and Tienda (1998) called "pull-out" forces, and which are not oppositional in character. Moreover, there were clear exceptions to this trend, as pointed out by many authors (e.g., Conchas, 2001; Gibson, 1997; Valenzuela, 1999): remarkable Hispanic students from low SES families, often families with few educational attainments and little support to offer, who were pursuing their educations in a way that was unusual in their families and close community. To a great extent these attainments appeared to be made possible by qualities that were part of these young people's own core characters: resilience, courage, perseverance, and a determination to try. So although opposition to education and mainstream assimilation was present, as Wildhagen (2011) suggests, it

appeared to be part of a larger system of influences, and not a dominant cause of student outcomes in many cases.

Slee (2014) and Furlong (1991) provide a discussion of minority academic attainment that offers additional insight into the patterns observed at Lakeview. Furlong, in particular, discusses how difficult the school environment is for all students, and that enormous energy is required for students to cope with it, which seemed to be well supported in this study by the persistent and varied behaviors in which students engaged that effectively maintained a kind of distance between themselves and the classroom. Lakeview's students (even IB students) enacted cycles of classroom activity, in which work alternated with periods of disengagement, apparently for the purpose of regeneration. The proportion of time devoted to each part of the cycle depended on factors within each student (like resilience and motivation) that gave them the resources for learning or not, as well as the norms of the cultures of which they were part. But Furlong's description suggests that students' positioning and attainment in classrooms are results of a very rational process which, he implies, students have considered and of which they have clear ownership, whereas these data suggested that was rarely the case, especially on the level of day-to-day activity. But even in the case of broad educational goals, most of the students in the general education program at Lakeview seemed not to have weighed the options open to them; they were startled if asked why they were not in an advanced program, and, in their explanations, they often seemed to be talking about the reasons for the first time. Similarly, IB students often had not considered any other track. Instead of making conscious choices about learning opportunities (either available programs or day to day learning) students' experiences of their family and school cultures

appeared to direct them (often without specifically discussing options) to a fairly small range of academic choices and aspirations, with most students end up on exactly those paths, enacting culturally-expected outcomes. It was only some students who became aware of the forces that were influencing them and were able to make other choices, which were always more conscious and considered, and often lead to higher tracks. The reasons why this may be so are beyond the scope of this paper.

Lakeview has a large minority of white students from rural homes, often from farming or ranching families, and this group of students appeared to have some important characteristics that might justify their designation both as a cultural minority group, but also as at-risk for academic underachievement. These students come from a cohesive subculture which differs in some key respects from mainstream school culture, much as the Mexican and Central American students do. They are also strongly underrepresented in the advanced groups on campus (although not in graduation rates). The highest-achieving students at Lakeview often held this group in mild-to-moderate aversion because of assumed lower intelligence, a perceived backwards culture, and their conservative political views. Because the farm and ranch students knew or suspected this, a quiet cultural war was ongoing in Lakeview's halls, in which this student group was often segregated and marginalized, but occasionally lashed out to demonstrate either contempt for the more liberal in-town white students, or attempted social superiority over the Hispanics. For example, a group of these students counter-protested during Lakeview's "March for Our Lives" protest (a walk-out and rally in response to school shootings, advocating school safety and gun law reform, mostly organized by IB students), and others were responsible for a spate of racist incidents on campus after

President Trump's election in 2016 (wearing a racist t-shirt, for example, or confronting Hispanics verbally outside of class). Both types of resistance are indicative of resentment that this group felt, and also suggest cultural barriers excluding these students from advanced classwork. A dynamic similar to opposition to school, at least schooling beyond the general education program and the agriculture pathway, appeared to be one of these barriers in some cases. Indeed, the social forces dampening rural white students' participation in advanced programs seemed to be just as strong as those which excluded Hispanic students, as evidenced by low numbers of farm and ranch students who were either in IB or taking IB classes. The school community, as well as our larger society, has an interest in disrupting these cycles of resentment and exclusion, if it is possible, and doing so might open higher academic opportunities to this group.

Finally, gender was very clearly influential in student behavior, and significantly determined whether opportunities and challenges could be accepted by students--a surprising finding when cultural forces in general include strong trends towards gender freedom. However, there seemed to be important cultural constraints on the gender expression of boys, as well a lack of empowering messages aimed at boys about the importance of their participation. Boys appeared to have a narrower range of acceptable behaviors and responses available to them, as dictated by their home cultures, so that minority, rural, and lower SES boys, in particular, felt the need to reassert their male gender identification often during the school day. For some this was clearly detrimental to their ability to learn and engage in classroom activities. Moreover, girls were positively empowered and inspired by a societal message that told them that their participation was important and valued, despite acknowledged barriers, while boys lacked

a similarly motivating, cohesive and repeated call to work harder. Instead, cultural messages appeared to offer boys excuses for working less, with girls and boys both repeating stereotypes about boys' later maturity, which gave boys an excuse to take less demanding paths and to prioritize entertainment (like video games) over academic work.

Traditionally schools have not been called to strongly influence their students' cultures, with the exception of enforcing norms necessary for diverse student groups to function generally in harmony on campus. Lakeview, for example, had a very active campaign that promoted the value of diversity; students were usually very supportive of the motto used to convey this, and its meanings, and they told me that they felt it made a positive difference on campus. Despite this the campus was surprisingly divided, with students often organized into cultural groups that got along largely because they ignored one another, and that afforded student members unequal access to Lakeview's academic offerings. Girls and boys, also, experienced strongly different opportunities within these groups. This suggests that working to influence social organization and student culture within schools might have the effect of creating opportunity for some students. It is not only important that students learn to understand and accept one another more deeply, but that students accept themselves and trust their own ways of enacting the multiple roles that they play within their families and cultures. And finally, it is clear from the experiences of Lakeview's girls that what we tell students about their positions in society, about their capabilities and responsibilities, can be effective. Reaching out to other groups with clear, repeated messages about the importance of their participation may be a needed and significant part of creating more equal opportunities and outcomes in school.

CHAPTER IV

WHEN STUDENTS RESIST SCHOOLS' ATTEMPTS TO DESEGREGATE, UNTRACK, AND CREATE PATHS INTO HONORS PROGRAMS

Why Have Schools Been Unable to Give All Students the Same Chance to do Well?

It is clear that our schools sometimes do not serve students well if they are somehow 'different'--if they are from ethnic or cultural minorities, for example, if they come from low SES families or rural communities, or if they are an underrepresented gender like girls in STEM.[5] These academically vulnerable students are not proportionally represented at many levels of academic attainment, such as high school graduation and college entrance (Krogstad, 2015; U.S. Department of Education, 2016), and they learn substantially less in school than do white, middle-class students (Hemphill & Vanneman, 2011; Reardon, 2011). So disadvantaged students often leave school with further disadvantages that can hold them back economically as adults, and in the meantime school achievement overall is reduced.

Recently, a high school that I worked with closely tried to address these disproportions by creating 'career pathways' that would link course content to students' occupational interests, create smaller communities of learners, and increase student engagement and achievement. A year and a half into the experiment, however, these measures were showing little positive impact. Remarkably, the career pathways had

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[5] In fact, boys' overall achievement lags behind girls' (Legewie & DiPrete, 2012), so some boys also can be counted among those who experience challenges in many school environments.

almost immediately become exclusively populated by students with minority status and lower SES. Some career choices (like the medical path) were dominated by traditionally lower-achieving students, to the extent that they became notoriously difficult to manage. Others were almost entirely composed of high-performers (like the engineering and business paths), who were from privileged families. So, although the program was intended to reduce de facto segregation within the school and improve learning opportunities for all students, instead the pathways became tracks, segregation was reproduced, and the most advantaged students were again served best.

One reason for this may be that school leaders underestimated the extent to which school outcomes are the result of habits, human interactions, and culture, which are not easily changed by good intentions, school policy, and institutional goals. The vignette above suggests that students' personal experiences, culture, and choices shaped the pathways program in unexpected and unwanted ways because the impact of student preferences was not accounted for in implementing the program. Conversely, however, understanding social dynamics in schools can be a way to anticipate which children do not have the same chances to learn as others, even when they are in the same classrooms, to select and implement policies better, and to find ways to open opportunities for more students to be successful.

How Students' Peer Groups and Individual Choices Contribute to Reproducing Traditional Achievement Patterns

Adults often divide students, early in their formal education, into groups according to the achievement levels that are expected of them. These divisions can be implicit and informal, such as when a teacher simply communicates low expectations to a

few students through classroom interactions (call this "informal tracking"), or explicit and formal, such as being assigned to low level mathematics or reading groups. In either case, we know that these groupings are often fundamentally inequitable. Lower groups are disproportionately composed of minority students, low SES students, and boys, and these students tend to be placed in lower groups than mainstream students even when they have similar abilities and scores (Oakes, 2005).

It is troubling that academically leveled groups tend to be fairly rigid, in the sense that it is difficult for students to move to higher levels (Oakes, 2005). For example, in the case of informal tracking, students generally cannot negotiate or advocate to be taught more, and the limited attention and feedback they receive from their teachers mean that they learn less (Usher & Pajares, 2008). Formal groups additionally restrict the learning of those in lower groups, because they are generally offered less-challenging tasks that stress basic skills and rote learning rather than the reasoning and critical thinking activities offered to higher groups (Heubert & Hauser, 1999; Oakes, 2005). There is often no mechanism for students to work their way up, and they know this. Moreover, students are likely to select their friends from the same academic tracks that they are in (Kubitschek & Hallinan, 1998), especially when learning groups are segregated by important social attributes like ethnicity. Because of this, established academic groupings often function as social groupings as well, and create systems in which some student groups have more or less status because of their academic assignments. This result can entrench the status quo: low-tracked students internalize the barriers that they experience in learning, and students in both low and high groups adopt and enforce the resulting social and academic barriers.

Students at Lakeview chose their career paths with friends, with whom they had previously shared an academic track, and then reproduced those tracks in their new classes through their behavior and expectations. That helps illustrate that social and academic dynamics can become reasons that students themselves may maintain their academic groups and the corresponding learning expectations throughout their school years once they are established. For example, when students internalize academic barriers, they accept the negative judgments of their teachers, and begin to think that mathematics, or reading, or school in general, is not for them and perhaps that they "are not good at math" or they "are not good in school." The way many students frame their labeling (i.e., what others say they *are* intrinsically) makes it clear that these interactions are sources of academic identity; they are formative in a student's sense of self (Lewis & Diamond, 2015). If students' experiences turn into negative assessments of their abilities, potentials, or the appropriateness of academic work for them, these assessments become self-fulfilling prophesies as the child begins to resist school and focus their attention on activities that are less emotionally draining, in which they feel happier and more successful. But as they slow in trying to learn, they can fall behind in ways that are harder and harder to overcome.

Just as children individually have internal systems that align their behavior in response to social forces that they experience and judgments they internalize, the social groups that form in classrooms and schools have systems that maintain social roles and social status once these have been established (these are basic behaviors of small groups; see Brown, 1990). That is, the individual students within groups are bound not only by norms within their groups but also by norms that regulate the interactions between groups

and which apportion resources among them. For example, grouping systems in schools and classrooms can convey social status (or withhold it), determine how students will act within and between groups, and confer public identity traits, like being "smart" or "dumb." The social dynamics within grouping systems are additionally troublesome when lower level groups are predominantly composed of students united by any identifiable trait, such as gender or ethnicity, because this can lead children to generalize beyond their immediate setting and create stereotyped expectations and prejudices that may be long lasting (Carter, 2005).

Student peer interactions can be strongly affected by group assignments and the resulting social bonds (Bank, 1997). Without explicit guidance that is aimed at addressing the social effects of public groupings, a small number of groups can capture both academic and social status, leading their members to resist working with classmates that they perceive to be of a lower status than themselves. Worse, lower-ranked students may not want to move to higher groups because of social consequences inflicted both by students in their original groups, such as rejection by friends because they crossed group boundaries, and in the new group, who may refuse to accept a new student, or accept them only superficially (Brown, 1990). The rigidity of formal grouping systems, then, can lie in students' social interactions as well as the actual academic difficulty of moving up to higher levels.

The social implications of academic groupings are important at all academic levels. As Lakeview found out, students who are assigned to academic groups may form cohesive social units with their own social norms and requirements which can be long lasting, surviving even the middle school to high school transition. High-status groups

can exclude other students, or students may make efforts to stay in lower level groups because they want to maintain friendships. However, it is likely that ability grouping in the early grades is especially important, because research suggests that after they are tracked, student ability differences tend to increase through the school years (Gamoran, 1986). Once students have been assigned to social roles through academic groupings, the social and academic forces they experience tend to reinforce the status quo, and students may continue to enact those roles and operate from those identities for the rest of their school years.

What Schools Should Know and What They Should Do

Each educational environment is different, and social dynamics are notoriously complicated, so it is impossible to recommend a certain remedy when experiments like Lakeview's take unexpected turns. Also, in some cases social patterns leading to these outcomes develop over years, so a number of mediation efforts could only be implemented by the elementary and primary schools whose students typically fed into Lakeview. Still, there are sensible steps that can be taken by Lakeview, or could be considered at the district level, to help break up predictable tendencies for students to choose to stay in known academic tracks even when better opportunities are offered, or to reproduce segregation in school bodies. I offer some of these below.

Especially at the elementary level, a number of authors have stressed the importance of making academic groupings fluid (e.g., Oakes, 2005). Their reasoning is that students need to be able to see that it is possible to move to higher levels if they try, because this both encourages hard work and helps to prevent a label stemming from academic tracking from becoming a part of a child's academic identity. To help ensure

fluidity, teachers might create new learning groups frequently, and attempt to keep them as heterogenous as possible, following recent recommendations for best practices in differentiated instruction (Tomlinson, 2017). As a result, children would then be working with students at higher levels (who can help them) and at lower levels (who they can help) regularly, and changing groups often could help prevent creating a rigid academic hierarchy, while de-emphasizing public labeling based on ability differences.

At the same time, it is crucial that academic groupings should be integrated by ethnicity, gender, and minority status, so that all students have peers in higher level groups (Bandura, 1977). Making high-level student groups diverse ensures that all students know that people like them can succeed, and it prevents students of all identities from stereotyping any group as more or less able than others. Conversely, when minority students are not included in higher tracks, students and parents can learn to resist allowing advanced educational opportunities to be integrated, a phenomenon that Lewis and Diamond (2015) call "opportunity hoarding.". In these cases, commonly held stereotypes about minority, rural, and lower SES students can become the basis of high achievers' objections to sharing classes or programs, such as beliefs that these academically vulnerable students are less intelligent, backwards politically, care less about their educations, and might disrupt high-level classes.

Segregated academic groups contribute to stereotyping among students, because students may associate tracks with both ability and minority status (Lewis & Diamond, 2015). So, making sure that academic groups are integrated is a step towards assuring that students of all minority, economic, and cultural groups are publicly attributed with intelligence, competence, and hard work. Because attributions like these are so basic to a

broader distribution of school success, pointed, thoughtful efforts to achieve diversity at all ability levels are warranted. Measures could include actively seeking diverse students to join higher level groups or to take student leadership roles in cases when they are underrepresented.

We need to be clear in communicating with students that a willingness to try and keep trying is the most valued trait in school; being "smart" and learning a concept quickly is pleasant for that particular student but not particularly admirable. Success should never be attributed to inherent qualities like intelligence or talent. Rather, success of those deemed "talented individuals" are attributed often to working harder and longer to acquire skills that later seem to be easy (Boaler, 2016; Dweck, 2006;). Carol Dweck's and Jo Boaler's work on mindset and establishing a culture of growth mindset has been shown to increase student resilience in the face of difficult tasks and to promote academic growth. However, I suggest the same remedy in this case for a different disease--a culture in which labels, like "smart" or "dumb," "Mexican" or "townie," can become intertwined and ingrained, and eventually carry the force of destiny. Further, because ability traits and labels are so often applied according to traditional stereotypes, it is important to be pragmatic and matter-of-fact in talking to students about ability, cultural groups, success, and advantages that some students may have. Boaler and Dweck suggest emphasizing that ability is the result of hard work, but hard work is not a racial trait, and we should be cautious not to simply replace one racial attribute for another. Instead, it may also be important to point out that some children enjoy different subjects, or that they are lucky in having learning resources at home, good teachers who encouraged them, and so on.

Finally, we should be cautious of how students will divide themselves when given a choice, even for activities as innocuous as team sports and elective subjects, because their choices reflect social hierarchies that we may have trouble appreciating. Their choices may reinforce patterns of social inclusion, exclusion, and cohesion among peer groups that have implications for the distribution of academic resources, or for students' determining together what academic behaviors are appropriate (or not) for their group because some students' social groups actually discourage positive academic behaviors. In the case of Lakeview, implementing career pathways without allowing students to make decisions that would create a stratified social and academic environment seems difficult, but it could be done. For example, students could have been assigned to heterogenous learning groups as freshmen, which then might survey the possible career paths together for the first year or two, or take a high-quality college preparatory program together. In either case, the additional time in an integrated environment could allow for the development of new friendships and social organizations, as well as the development of more thoughtfully considered career interests. It is possible that juniors who had experienced a diverse social and academic environment for some time might be able to make better choices than they would have as freshmen.

Conclusion

Lakeview was taken by surprise when students' social agendas turned an innovative academic program into a school-wide segregated and tracked system. School leaders had underestimated the extent to which students' social groupings have implications for their academic achievement and success. However, school leaders can consciously influence a powerful determiner of student identity and academic

engagement by cultivating specific social environments as part of school culture, or by disrupting social patterns that get in the way of student participation and achievement. Measures that do this also decouple academic labels from cultural, ethnic, or economic status, and allow students to move more freely between academic groups, especially in order to choose more rigorous programs. By doing so, schools offer a fairer playing field and gain the potential for increased learning at all levels.

CHAPTER V

CONCLUSION AND IMPLICATIONS

This final chapter presents the major conclusions obtained from the study. It discusses how the study contributes to scholarly literature, considering several themes which arose during the analysis process and were presented in the research paper (Chapter III of this project document). In particular, aspects of the study which suggested the importance of students' social and cultural norms, and for the importance of home community norms like gender expression, are considered. Finally, I suggest implications for practice and recommendations for further research regarding gender identification norms, school culture, and the International Baccalaureate (IB) Program.

Summary of the Study

The goal of this study was to investigate social and cultural factors which influenced minority students' choices to attempt advanced coursework, especially the International Baccalaureate Diploma Program (IB DP, or just IB as appropriate), at a diverse and academically successful high school in the Western United States. The research was conducted using ethnographic methods, with an observation period spanning almost a full school year. Data collection included observations in school classrooms, public spaces, and at special activities and events, and also in-depth interviews with both mainstream and minority students representing the AP and IB advanced tracks at the school. These data eventually offered a rich portrait of the cultural

environment of Lakeview's advanced programs, and the topics of the papers presented here were selected from the most important findings that emerged.

Several important themes concerning social forces experienced by students showed that culture and peer relations did have an impact on minority students' program choices. The first was the culture of the IB peer group itself, both in terms of how IB students were perceived by Lakeview's general education population and how they functioned as a social group (that is, their in-group norms). Outside the IB program, IB students tended to be seen as stressed, intense, politically progressive, and elitist. This reputation sometimes served to discourage students of any background from attempting the IB program, especially if they felt that they could learn just as much in general education, honors, and Advanced Placement (AP) classes. Moreover, within the program the student culture was demanding and sometimes harsh. The IB culture required members to display a specific set of intellectual attributes (for example, intelligence and love of learning) in order to be accepted, and it encouraged them to participate in an environment which emphasized competition and stress, made tolerable by a close-knit constellation of "friend groups" who generally negotiated their IB years together. It was difficult for minority students to gain full membership, and even more difficult for them to cope with IB's social norms as peripheral members who lacked some of the social and academic strengths that other IB students had.

A second important factor in minority students' participation in advanced programs concerned differences in how gender identity was enacted and expressed between girls and boys, between minority and mainstream students, and between general education and IB students. These differences were observable by watching the kinds of

gendered behaviors (public behaviors intended to convey gender identity signals) that students performed. Boys displayed gendered behaviors far more than girls did in many cases, and their forms of gendered behaviors often disrupted their ability to participate in classroom activities. Girls, on the other hand, tended to express gender identity less intensely, and in ways that were more consonant with classroom norms. Minority students of both genders tended to enact more prominent and frequent gendered behaviors than mainstream students, and students in lower level classes did so more often than students in higher level classes, such as AP and IB. The IB students, in particular, were notable in that they engaged in relatively few gendered behaviors. Gender, therefore, and how students expressed gender, had important implications for school success. Students whose communities (either home or peer communities) demanded relatively high levels of gender differentiation and gendered behavior were at a disadvantage with respect to school participation and achievement. This effect was stronger for boys than for girls. Girls, in addition, often experienced empowerment from societal messages encouraging them to succeed despite structural advantages that favor boys, and this was, paradoxically, a factor in girls' greater achievement and ambitions than boys.'

Implications of This Research to Literature

Ethnographic work, which reports its results using thick descriptions and the interpretations of these descriptions, produces works that may have layers of meaning and hence may be pertinent to a number of different research areas. The research reported here is typical in that sense. Three themes discussed here stand out as offering possible contributions to scholarly literature: research about the IB program, discussions of the

role of gender in education, and finally research about school opposition or school resistance, including that surrounding the controversial work of John Ogbu. In each case, this study offers a somewhat new perspective, linking known results to questions that have not yet been explored.

The body of published literature about the IB DP program is fairly small, perhaps because the program itself is not well known. Typical research themes include students' perceptions of advantages and disadvantages of their programs (e.g., Foust, Hertberg-Davis, & Callahan, 2009; Shaunessy-Detrick, Suldo, Roth, & Fefer, 2014), the climate of the program, especially the pressures students experience in it, and how students cope (e.g., Foust, Hertberg-Davis, & Callahan, 2008; Shaunessy & Suldo, 2010), and more macro-level work describing the IB program overall, or specific programs (Bland & Woodworth, 2009; Mayer, 2008; Perna et al., 2015). The work on minority participation in IB is mostly from this latter category. For example, Perna et al. (2015) describe minority access to IB using quantitative data from the International Baccalaureate Organization's own database, and Mayer (2008) includes consideration of one IB program's outreach and support for minority students.

The results from the current study are different in a number of ways. Its ethnographic treatment, focusing on Lakeview's social environment and culture, appears to be unique. The results, therefore, offer a middle ground between narrower qualitative investigations that report student perceptions and experiences, and broader studies whose wider focus blurs student interactions. Moreover, few previous studies seek reasons for a lack of diversity in IB DP, or describe the experiences of minority students who struggle for acceptance in the program. Finally, this study is the only one I am aware of which

pays particular attention to mathematics within the IB curriculum. These differences in perspective are useful contributions to the literature about the program.

Far more has been written, and is known, about the importance of gender in education, but here also this study approaches the topic somewhat differently. Multiple specific subtopics might be pertinent here, but the most important are those treating boys' academic underachievement (including in mathematics), reasons for differences in boys' and girls' school participation (including in mathematics), and ways in which minority school participation may be impacted by gender to a different extent, or in different ways, than for mainstream white populations.

Esmonde (2011) complains that the issue of boys' lower achievement in school, although discussed in other educational areas, is not well known or attended to in mathematics circles, perhaps because of mathematics educators' continued assumptions that boys have an advantage in their field (as indeed they do, although more narrowly than in the past). Nonetheless, research confirms that girls are in general achieving better grades at all precollegiate levels (including in mathematics) and complete more college degrees (Fortin et al., 2015; Voyer & Voyer, 2014), and that this trend extends generally to developed countries, such as those in Europe, the United States, Japan, and Australia (OECD, 2015). Males still enjoy small test score advantages in mathematics, but they are slowly losing their dominance in most STEM fields, including in mathematics, where females now earn 44% of bachelors' degrees (Cheryan et al., 2017). Achieving equity in education has now begun to mean raising boys' achievement in most areas and maintaining it in STEM, while at the same time encouraging girls in STEM. The research

reported here agrees with these results and provides a description of on-the-ground conditions reflecting these trends in at least one setting.

Theories concerning the reasons for boys' academic underperformance are more varied, including suggestions that it may be due to girls' and boys' different capabilities to cope with family disadvantage like low income and divorce (Autor et al., 2016), stereotype threat due to adults' conveying beliefs about boys' academic inferiority to very young children (Hartley & Sutton, 2013), and variations in academic expectations or vocational interests between boys and girls (Fortin et al., 2015), as examples. This study cannot support or refute any of these contentions. Instead, Lakeview's lower achieving male students resisted school, exerting in some cases very little effort in class, because of their male gender differentiation needs. A review of the literature revealed a small group of papers approaching the problem in this way, including Legewie and DiPrete (2012), who use ethnographic data to make connections between masculine identity expression and school resistance, and Morris (2008), discussing rural white gender norms and school achievement. The results of this study lend weight to their point of view.

Finally, the question of differential school outcomes for minority students based on gender has been answered in a variety of ways. Strayhorn (2010), for example, suggests that sociocultural capital plays a large part in this disparity, while Mickelson and Greene (2006) attribute the difference in African American boys' and girls' school achievement to peer influences, educational attitudes and school climate. However, gender expression differences related to minority cultural norms are sometimes invoked, including by Catsambis (1994), and, perhaps most notably, Carter (2005). The research here extends this argument slightly, including rural white and other minority subcultures

(not just ethnic or racial minorities) among populations whose boys may struggle with school achievement because of masculine identity expression norms, but in general accords with the results of these authors.

In a final note regarding gender research and the results of this study, I know of no other studies that describe the kind of female empowerment that Lakeview's girls experienced from being challenged to overcome gender stereotypes and male advantages in school and work. Gender is such an enormous area of research that it is probable that such a study does in fact exist. Nonetheless, the point is worthy of making a second time, because among the many factors identified as having an impact on student achievement, this one is possibly unique in that it exists simply because people in communities, in the media, and in school buildings are talking about it. It is a heartening result, that encouraging girls makes a difference, and suggests the possibility that similar concerted efforts could improve the outlook for other populations as well.

A final research theme to which this study may contribute is that of school resistance, a concept that seems to be discussed in a limited way: in ethnographic descriptions of some students' school participation behaviors, in some sociological papers, such as Legewie and DiPrete (2012) and Geven, Jonsson, & van Tubergen (2017), and in the work of John Ogbu (Ogbu, 1992, 2003; Ogbu & Simon, 1998). School resistance simply means that some students will reject school participation to a greater or lesser degree for social reasons: because their communities and peer groups emphasize enactment of gender identity that is incompatible with school behavior and participation norms, for example, or because their ethnic or cultural communities have reason to be concerned whether mainstream schooling helps and strengthens their community or not.

The sociological works referencing resistance to school hypothesize that is it largely motivated by gender, noting that boys are often unable to participate in classroom activities because of gender behavior norms arising from their home communities (Legewie & DiPrete, 2012). Ogbu, on the other hand, focused on the second motivation for school resistance, locating it in communities' mistrust of the American mainstream and doubt that compliance to school norms would in fact yield promised economic rewards (Ogbu & Simons, 1998).

It is, without a doubt, an act of resistance to cite Ogbu in the current academic climate (Hamann, 2004). Ogbu originated a theory (cultural-ecological theory, or CE theory) purporting to explain the school underachievement of some American minority groups, which relied heavily on economic motivations, job market inequities, and historical oppression as explanatory factors (Ogbu & Simons, 1998). But Ogbu also was critical of the African American community's determination and resilience in sometimes harsh ways (Ogbu, 1991), for example creating the epithet "low-effort syndrome" to characterize African American youth's classroom engagement, and at times seemingly to chastise African American parents for not adopting middle-class white parenting models that emphasize school achievement (Ogbu, 2003). Ogbu has been accused of "blaming the victim" (Lewis & Diamond, 2015) because he located one source of African American underachievement in the African American community itself. He has also been co-opted by conservative writers who were, in fact, determined to locate the source of minority communities' lack of success within those communities (e.g., Christie, 2010), and not an overarching, systemic discrimination which seemed unassailable, despite compliance with the demands of the dominant culture. A paper that Ogbu co-wrote with

one of his graduate students, Signithia Fordham, which described a system of peer sanctions that reined in academic success by characterizing pro-academic behaviors as "acting White," may have been a metaphorical straw breaking the camel's back (Fordham & Ogbu, 1986).

Ogbu, however, made an important contribution to the understanding of minorities' school achievement by considering two potential sources of minority communities' school resistance: system forces, which represented societal inequities such as racial prejudice, and community forces, which were coping mechanisms within minority communities which maintained them during times of seemingly limitless inequities, but which could be less adaptive when conditions changed and opportunities for success became more available through participation in mainstream institutions. At the time, this perspective was dual-dimensional and innovative; more recently Ogbu's work has been criticized as being simplistic and static (Foster, 2004; Warikoo & Carter, 2009), because it does not account for the how other elements of identity such as SES, gender, and local cultural context can contribute to cultural and school achievement outcomes.

The perspective of this research is that Ogbu's understanding of community forces (which are cultural norms of students' home communities) are an important aspect of students' willingness to engage with mainstream schooling, and that gender expectations they experience because of cultural norms are part of these community forces. Therefore, both the sociological and the cultural-ecological perspectives have a place in understanding school resistance, as would any credible third perspective that added understanding of the complex social forces from which an individual's motivation

and willingness to participate in school arise. While the results of this study clearly

support the contention that gender is a major factor in school resistance, in line with the

school resistance work represented by Legewie and DiPrete (2012) and Geven et al.

(2017), it does not contradict the possibility that other factors within some communities

give rise to ambivalence about schooling that impact their students' school achievement,

as Ogbu predicted. Indeed, the fact that various subcultures' enactments of school

resistance are different suggests that a second factor besides gender, akin to Ogbu's

community forces, may be needed to understand achievement patterns more broadly. The

sense of this study is that both dimensions are important.

Implications to Practice and Policy

The study reported here was in some ways very specialized, and so leaders and

policymakers who would be most interested in its implications will be a very specialized

group. Those involved in planning, implementing, or teaching in the IB program are, of

course, among these, but staff in any school with a very cohesive, high achieving, upper

tier of students that remains relatively segregated might also find some results that were

of interest to them. A few of the results, like those about boys' achievement and the

strong effects of school and student cultures on diversity efforts, could be of more general

interest.

One category of policy suggestions concerns student cultures in IB programs. The

harsh elements of the program reported on in this study, like an overly great emphasis on

competitiveness and an exacerbation of student stress, seemed to occur because no adult

was paying attention. Anja's statements, reported in Chapter 3, show that competitiveness

is not inevitable, for example, and that norms established by adult authority figures make

a difference in program culture. International Baccalaureate students are so bright, engaging, and hyper-responsible that it might be easy for the adults around them to assume that they are managing their lives and relationships well without help, but they are still young people who need the guidance and attention of adults. Teachers, counselors, and other mentors should actively monitor the culture that they create and help them to take care of their mental health, as well as understand the deeper responsibilities of inclusiveness.

Concerning the participation and achievement of boys, this study strongly suggests that some boys benefit from a school atmosphere that is specifically crafted to accommodate gender identifying behaviors such as loud voices, periods of physical activity, and male teachers. While not every school has the resources to allocate space for a construction site on campus, the same idea of combining a core subject like mathematics with a traditionally male activity could be implemented in many ways: academics could be combined with sports, rock and roll or hip hop music, firefighter or EMT training, and so on. The truly irreplaceable aspects of Lakeview's geometry class that built a house appeared to be allowing boys to express most gender identifying behaviors without comment, interspersing intellectual work with masculine, physical work, and regular life skills training. It is notable that the girls who chose that version of geometry often also benefited from it markedly (and went on to join high achieving groups in some cases). The full impacts of such programs are so far unknown but appear to be highly positive in several ways. In any case, some boys, including ethnic minority, low SES, and others, appear to need gender-specific interventions that are still unavailable in many schools.

Diversity awareness is another area in which this study can make possible policy suggestions. Lakewood was remarkably committed to its diversity program, which manifested in a particularly thoughtful slogan which students knew and whose meaning they could explain, the many individual teachers who took it upon themselves to mentor and encourage minority students, and their extending an invitation to me to help them understand diversity issues in their IB program. If nothing else, their experiences show that these measures (as important as they are) are simply not enough. Lakeview's student body was segregated to a remarkable degree, and without often expressing outward animosity, students still did not get along in some fundamental ways. They ignored each other as a way of maintaining public peace.

A next step in diversity could include all of the slightly intrusive, but long recommended, measures that get students to work in mixed groups and eventually to know members of other student subcultures as colleagues and friends. Students' social groups, which are often segregated by academic achievement, SES, minority status, or by other subcultures, are a key to deeper integration. In order for students to make new friends, and to be relieved of the pressure to participate in school according to peer group norms, classes and learning groups should be integrated as best as possible, so that they are heterogenous with respect to achievement level and student subculture. Finally, talented students from minority groups can be asked to participate in elite programs or to take visible leadership roles, with mentoring as needed, or as part of cohorts for support. To the greatest extent possible, each campus minority group should have visible examples of peer role models who are academically successful at the highest levels, who

participate in school functions in ways that are publicly valued, and who embody success of a kind that contravenes traditional societal expectations.

Limitations

This research has limitations arising from at least two sources: the fact that it is qualitative in nature, and the methods and analysis procedures used in this specific case. These impact the quality, scope, and generalizability of the study in somewhat different ways.

Qualitative research is so specific in setting, and often uses such a small sample, that some authors simply state that "generalizability" has little meaning with respect to its studies (Creswell, 2013). It is true that any attempt to use this research by anyone other than its participants is an attempt to generalize; even scholars' use of qualitative studies as a source of examples, a basis to create theories, and so on, is a form of generalization (as is considering policy or pedagogical changes based on recommendations like those above). Care must be taken not to overstep. Qualitative studies, including this one, at best suggest possibilities, which then can be tested in contexts of interest, with the onus of responsibility for the appropriate use of the data on the user. This reader generalizability (also called user generalizability; see Wilson, 1979) is both weak and powerful. In effect, it reinforces the general principle that qualitative studies prove nothing beyond their original contexts but allows for them to be a source of ideas and inspiration. The study presented here should certainly be viewed through this lens.

Other weaknesses are specific to the construction of the study, and as such are produced, or managed, by the researcher. Limitations on resources available (such as time in the field and for writing) and constraints on the final reports (like page length

restrictions for journal submissions) were some which I felt the most strongly. I am very aware, for example, that virtually all of my formal interviews came from students in the top tier programs at Lakeview, although it would have been valuable to get more general information from the middle and lower tiers. This is especially true with respect to Hispanic students, and although it would have been a significant broadening of my research question to also include them, I regret the fact that I was not able to get more of a general understanding of the Hispanic community. These issues affect the completeness of the picture of Lakeview that I was able to offer, and in at least some ways may have reduced the accuracy of an observation, or the extent to which I was able to offer a satisfactory answer to a question.

Lastly, all qualitative research relies heavily on internal qualities of the researcher. These include capacities like insight, empathy, judgment, sensitivity, and discretion. A year is hardly enough time to develop some of these qualities, and for that reason I feel certain that my own inexperience limited this work.

Future Directions

The aphorism that research can yield more questions than answers certainly holds in the case of this study. Each of the three themes explored here (IB culture, gender in education, and resistance to participation in school) is complex, and the results obtained are no way definitive. This section describes directions for future research suggested by this study, especially with respect to the same themes treated previously: minority participation in the IB DP program, the implications of social factors and gender on students' participation in school, and school resistance.

The weakness in the research literature on minority participation in IB is particularly pronounced, and so the results of the current study suggest a number of further avenues to explore. Certainly, it would be valuable to pursue deeper work on the experiences of Hispanic students in IB, which is more integrated with Hispanic students' understanding of their families, communities, and academic backgrounds. Moreover, the experiences of Hispanic males in IB programs are notably missing in this work, since Lakeview had none enrolled in the program at the time the study was conducted. Later studies should also ask whether similar social conditions excluding Hispanic students exist in other IB program settings, and whether IB peer cultures negatively impact the participation other minority groups, such as African Americans, rural whites, Native Americans, LGBTQ and other gender minorities, and so on. It should be a priority as well to determine which school and peer conditions produce IB cultures that are exclusive of diverse students and notably harsh for mainstream group members, and which conditions can mitigate them. Also, to my knowledge there are few studies that focus exclusively on IB mathematics; this is an unexpected void in the literature, since IB mathematics is so different from that of other programs. Considering the unique aspects of the IB mathematics program, including its impacts on students, advantages it may offer to STEM-oriented students in their college programs, and so on, could be important to mathematics educators.

Gender in education is such a sprawling field that it is surprising to find any unfilled niche left in it, and yet these findings do suggest that more work should be done. Although boys' school behavior has been investigated, particularly from the point of view of their frequent lack of academic effort, I am aware of only one study besides this

one that has suggested that in some cases this behavior slides into the realm of school resistance. The framing of boys' under-participation as school resistance has the potential to suggest avenues for addressing the issue in ways that other perspectives do not. Confirmatory studies which ask whether boys do indeed commonly resist schooling, and, if so, which boys and which settings are most likely to be affected by school resistance, are called for as a first step. Of course, the ultimate goal would be to describe ways to mitigate these effects if they exist, so finding and evaluating such measures would be important later.

Girls' academic participation merits further attention. The finding of this study, that girls in some cases found additional motivation to participate in school and to accept academic challenges because societal messages and specific encouragement to overcome obstacles, seems not to be well known. However, it also suggests questions to explore. Further research could determine how widespread this phenomenon is, and the extent of its impact. Minority girls may in fact have specific versions of these messages which benefit them, while boys may also be strongly affected by messages they receive, either in positive or negative ways. Finally, it seems obvious to ask whether creating urgent, affirming, and motivating social messages for boys could be one way to address their lack of participation and subsequent underachievement.

School resistance (and indeed oppositional culture as a whole) is a last theme, important in this research, that calls for substantially more study. Although oppositional culture, "acting White," and the work of Ogbu have accumulated a substantial library of studies, discussions, and criticisms, this work has been surprisingly unproductive, perhaps because of the emotional nature of the debate for many researchers. To say that

no definitive results have been reached would be to understate the case to a large degree. However, although it may be that those research topics are less attractive because they are fiercely debated, new research lines stemming from them might be fruitful. Theoretical work is needed to clearly define and describe the construct of school resistance, suggesting what behaviors define it, and what its underpinnings are. Confirmatory studies showing that it exists should be attempted. Populations which might be affected and settings where it might occur should be carefully described, and (for the brave) a discussion paper offering comparisons between school resistance and oppositional culture, and contrasts between them, could yield powerful understandings. A related question is whether there might exist such a thing as resistance just to mathematics. This answer would of course depend on how, precisely, school resistance was defined as a whole, but many students find studying mathematics to be a particularly emotional and intense experience, which might be sufficient cause to consider the possibility. In summation, individual students may always decide that schoolwork is not appealing to them, but if peer cultures and community norms are creating a group effect that lowers school achievement for an important fraction of students, that effect is an important topic for study.

Conclusion

This study explored how social factors and student culture were important in restricting minority students' access to an IB program at a diverse high school. These barriers existed despite a strong official culture valuing diversity, and despite particular efforts by administrators and staff to encourage and support minorities in attempting challenging academic programs. These efforts, however, were hampered because in-

group norms within the IB program set membership standards for attributes like demonstrated intelligence (in the form of grades or other public evidence) at levels which minority students found difficult to attain, and which in some cases masked underlying prejudice. Moreover, gender norms within some boys' peer and home communities, demanding strong expression of masculine attributes, made it difficult for boys to participate in school and impaired achievement for some, contributing to lack of diversity in advanced programs. Importantly, both of these problems are social--arising out of human interactions--and as such might be addressed through social means, such as adult mentorship for lower achieving male students, or more adult oversight and guidance for student groups such as IB.

There is no need for finger-pointing to assign blame for the effects noted in this study; Lakeview's story is largely one of staff and students acting out of the best intentions, and achieving success for many students by doing so. But it is also clear that in many cases Lakeview's students need more adult guidance to create and maintain healthy social systems that are truly diverse, and more flexible understandings of gender, in order to open avenues of achievement for some students. If there is a moral to Lakeview's story, it is that young people need to learn some of the biggest of life's lessons, about identity and equality and achievement, from the adults around them.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

DATE: February 27, 2017

TO: Elizabeth Scott-Janda
FROM: University of Northern Colorado (UNCO) IRB

PROJECT TITLE: [1002984-2] Factors Influencing the Retention of Hispanic Students in an IB
                        DP Program
SUBMISSION TYPE: Amendment/Modification

ACTION: APPROVED
APPROVAL DATE: February 25, 2017
EXPIRATION DATE: February 25, 2018
REVIEW TYPE: Expedited Review

Thank you for your submission of Amendment/Modification materials for this project. The University of
Northern Colorado (UNCO) IRB has APPROVED your submission. All research must be conducted in
accordance with this approved submission.

This submission has received Expedited Review based on applicable federal regulations.

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

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

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED
adverse events must be reported promptly to this office.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this
office.

Based on the risks, this project requires continuing review by this committee on an annual basis. Please
use the appropriate forms for this procedure. Your documentation for continuing review must be received
with sufficient time for review and continued approval before the expiration date of February 25, 2018.

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

If you have any questions, please contact Sherry May at 970-351-1910 or Sherry.May@unco.edu. Please
include your project title and reference number in all correspondence with this committee.

I appreciate your thoughtful answer. Best Wishes, Maria

APPENDIX B

**SUBMISSION RECEIPT FOR RESEARCH PAPER
(HARVARD EDUCATIONAL REVIEW)**

Dear Elizabeth,
Thank you for your interest in ==Harvard Educational== Review. We have received your submission and look forward to reviewing it.

Thanks!
-==Harvard Educational== Review
- -
NOTE: Do not reply to this email. This address is used for notifications only. If you need technical help, contact Submittable Support: support@submittable.com
- -

APPENDIX C

**INVITATION TO RESUBMIT RESEARCH PAPER
(HARVARD EDUCATIONAL REVIEW)**

Submittable

Dear Dr. Scott-Janda,

Thank you very much for submitting your manuscript, The Impact of Social Forces on Students' Access to Advanced Mathematics Courses: Ethnicity and Gender Matter, to Harvard Educational Review. The editors have read the manuscript and have made a decision. The following letter is from Content Editor, Thomas Kelley-Kemple.

BEGIN
June 5, 2019

Dear Dr. Elizabeth Scott-Janda,

Thank you for sending your manuscript, The Impact of Social Forces on Students' Access to Advanced Mathematics Courses: Ethnicity and Gender Matter, for consideration at Harvard Educational Review (HER). After preliminary screening of the piece, I'm sorry to inform you that the manuscript has not been accepted for publication.

The editors thought the piece very interesting and that it might fit in well with HER's aim and scope. However, regrettably the length is a barrier for our current publishing standards. With respect I ask if there is any way you can edit the manuscript down to 11,000 words for review?

Another way we might move forward would be for you to place a request for an invitation from our editorial board. The idea here is that an HER editor might be able to work with you through feedback prior to submission. While the invitation does not guarantee publication, authors generally find this process is helpful for developing and refining their manuscripts.

APPENDIX D

**SUBMISSION RECEIPT FOR LITERATURE REVIEW
PAPER (FOR THE LEARNING OF MATHEMATICS)**

Dear Elizabeth Scott-Janda,

Thank you for your submission. Your manuscript has been assigned the reference number FLM-19F191 and has begun the review process. The first stage involves sending the paper to the two associate editors and a member of the Advisory Board to assess its suitability for FLM. It typically takes 3 to 5 weeks. We hope to have further news soon.

Best wishes,

Elke Naber

Editorial Assistant