Ways with words: Language Play and the Science Learning of Mexican Newcomer Adolescents.

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Abstract
Language Play and the Science Learning of Mexican Newcomer Adolescents.

Disciplines
Bilingual, Multilingual, and Multicultural Education | Education | Higher Education | International and Comparative Education | Other Education

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INTRODUCTION

What happens when the cultural and linguistic practices of Mexican newcomer students intersect with those of school science? According to Koole (2003), we can expect that culturally- and linguistically-diverse students will not only bring along their differences to their science learning, but they will also bring about differences in the science classroom. The excerpt above illustrates how the presence of Mexican newcomer students transforms a common feature of talking science in the classroom – student admonition. Linda rhymes a key word in the day’s science lesson – “volcano” – with the phrasing of Julian’s challenge – “OK no” [Don’t OK me]. Her playful language work construes a hybrid discourse practice reflective of the intersection of the language of school science with that of students’ home communities. This hybrid discourse practice marks Linda’s classroom as a “contact zone” where, as Pratt (1991) puts it, “cultures meet, clash, and grapple with each other” (p. 3). Linda’s exchange with Julian is a virtual time-stamp of a contact zone, illustrating how, in one moment, language, science, and (contested) power converge.

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The premise of this chapter is that students' crossings between the world of home and school science is characterized by such contact zones and the cultural and linguistic collision-moments they evoke. With a particular interest in meeting the needs of Mexican newcomer adolescents as they negotiate these crossing collisions, I document here one variety of a host of hybrid practices I have observed emerging in the contact zone of an "English Learner Science" classroom (Richardson Bruna, 2007). With the Mexican population increasingly on the rise in the United States, especially in the demographically-transitioning rural Midwest (Millard & Chapa, 2004), the understanding gained in examining such culture and language crossings is not to be underestimated for they illuminate, as Guerra (1998) points out, "the increasingly heterogenous future that awaits us all" (p. 5).

The goal of improving academic outcomes in science for U.S. Mexican youth (youth living in the U.S. of Mexican heritage, regardless of place of birth) has, especially in the No Child Left Behind policy era, gained considerable momentum. Notable research projects, such as those undertaken, for example, by Lee and her colleagues (Lee, & Luykx, 2005; Cuevas, Lee, Hart, & Deaktor, 2005; Lee, Hart, Cuevas, & Enders, 2004; Luykex, Cuevas, Lambert & Lee, 2004; Hart & Lee, 2003; Fradd, Lee, Stuman, & Saxton, 2002), attempt to identify and disseminate a body of knowledge, skills, and dispositions that science teachers can employ and embrace to raise the achievement of this and other English Learner populations. Little is known, however, about the learning experiences of newcomer U.S. Mexican students, those who have recently arrived, as they make sense of the collision-moments they encounter between their home and school worlds in the contact zone of the science classroom.

There is a long-standing tendency in educational research to equate the teacher's formal instructional activity with student learning. This tendency has rendered invisible the efforts of students themselves to make their learning meaningful because it automatically relegates informal (social) student activity to the margins of the learning situation. This chapter brings what has been on the margin to the center. Because characterizations of classroom environments involving U.S. Mexican English Learner youth create the perception that these students are particularly noncompliant or disengaged, that they are "acting out" (Hurd, 2004), in re-centering what constitutes meaningful learning activity, I aim to re-cast what would otherwise be understood as "disruptive" language practices. Instead of collision-moments, I am interested in collusion-moments. For the Mexican adolescent newcomer participants in my research, collusion-moments were small opportunities students used to conspire towards their learning, to make room for it, so to speak, around the periphery of formal classroom activity. "Collusion," from the Latin con-, "together," + ludere, "to play," is, literally, the collective use of play to achieve some (usually unsanctioned) end. This chapter is more specifically about, then, Mexican adolescent newcomers' playful ways with words, ways in which they use language play to collude to learn and, in so doing, construe a hybrid discourse community in their science classroom.
I write this chapter from the heart of the Midwest where communities are undergoing what is referred to, with distanced sterility, as “rapid ethnic diversification.” Some of the world’s largest packing plants that put meat on plates across the nation are located here. Their presence draws increasing numbers of laborers from Mexico who are attracted by the prospect of more permanent, as opposed to seasonal, work, a low cost of living, and high hopes for a quality education for their children. The dramatic increase of Mexicans immigrating directly to traditionally non-settlement communities, such as communities in the rural Midwest (as opposed to historical “gateway” entry points like California and Texas), is part of what scholars term “The New Latino Diaspora” (Wortham, Murrillo, & Hamann, 2000). Rural Midwest communities are transformed by these, to use an increasingly visible term, “New Iowans,” invigorated in ways both tangible and intangible. Plant employment increases, stores expand, and school enrollment soars. In the community I study, 13% of residents are Latino, the majority of Mexican descent. 18% of the otherwise predominantly white (77%) high school student population is Latino, a percentage that is 9 times the state average. Of total high school enrollment, 13% of students are designated ELs primarily from Spanish-speaking households (Captainville2 Community Schools, 2003-4). The demographic transition that these numbers represent signals the emergence of new cultural identities and social relationships. Schools and classrooms, in particular, are sites where forms of talk and interaction generated from different cultural and linguistic contexts juxtapose (Kamberelis, 2001), resulting in new hybrid discourse practices that challenge the conventional narrative of what talking, teaching, and learning science is all about. Science educators and teacher educators who understand these practices will be best positioned to assist Mexican newcomer youth to negotiate the borders between their home cultures and those of their school settings (Phelan, Davidson, & Cao, 1998; Aikenhead & Jegede, 1999).

Adolescents, as educational anthropologists Phelan, Davidson, & Cao (1998) remind us, inhabit multiple worlds: the worlds of family, peers, and school. The more similarity in values and norms that exists between one world and another or, importantly, the more at ease they can put themselves in negotiating the differences between these worlds, the more successful their transitions will be. Aikenhead & Jegede (1999), who study cross-cultural science education, agree. They believe that it is possible and desirable to identify elements of instruction, strategies that “do not require students to give up or hide important features of their lives” (p. 246), that serve to ease students’ crossings into science. They refer to Lugones’ (1996) experientially-rich account of her own at-ease making in cultural and linguistic border crossing, a prominent feature of which was the adoption of an attitude Lugones describes as “playful.” “The attitude that carries us through the activity,
a playful attitude,” she writes, “turns the activity into play” (p. 431). Lugones’ primary concern is not about competence, it seems, but about being creatively and actively in the moment.

Gee (2003) asserts that creative and active play has a lot to do, however, with competent teaching and learning. He uses his research on playing video games to articulate the pedagogical principles that are built into their design, principles that “enhance getting themselves learned” (p. 6). At the heart of his argument is that learning most effectively proceeds when it occurs in intimate relation to a particular semiotic domain and its particular constitutive social practices. This is why, according to Gee, schools are failing children. Schools teach children about science, for instance, but fail to provide them opportunities to, in fact, be (or play at being) scientists. We need, instead, pedagogies that return science content to the community of practice from which it has been, over time, extracted and abstracted (p. 21). We need, in essence, pedagogies of science play.

Learning that is embodied and situated in play allows individuals to take on what Gee calls a “projective identity” with respect to the particular community of practice. An individual takes on a projective identity when s/he regards oneself in relationship to the community of social practice as a “project in the making” (p. 55), one who has a (projected) learning trajectory defined by their aspirations and their limitations as well (p. 55). The acquisition of a projective identity is fed, by the learner’s “appreciative system” (p. 96). For youth, he explains, appreciative systems are often built around what they like or not about the particular community of practice. This is different than adults who enter the professional domain of that practice community looking to align their appreciative systems with the values of its “insiders” (p. 97). In both cases, however, individuals’ personal values, which may be rooted in their cultural identities, can affect their regard for the community of practice and affect the acquisition of a projective identity. This is why understanding how an appreciative system works is so important for educators. It is, as Gee argues, “the only place where not only the affective and cognitive merge and come together, it is the place where the social, cultural, and personal merge and come together as well” (p. 97). Attention to appreciative systems, then, is essential in the design of science pedagogies (of play) that aim to facilitate student acquisition of projective identity. Ultimately, of course, as Gee points out, what is of utmost importance is not that the individual actually becomes (or has the competence to become) a scientist, but rather that “they have sensed new power in themselves that can last a lifetime” (p. 67). In this way, the failure of schools to engage students in general and culturally- and linguistically non-dominant youth in particular can be understood as a failure to provide students with opportunities to take on projective identities in various communities of social practice, to reveal to students a multiplicity of power potentials.

Do students know that schools are failing them? Not those for whom the business-as-usual of passive learning works. It took a direct question from my Anthropology of Education professor, Concha Delgado-Gaitán, for me to grasp how immensely my “success” in school had made me oblivious to its failures and inequities. For everybody else, it took a direct question from Concha’s Anthropology of Education professor, Concha Delgado-Gaitán, for me to grasp how immensely my “success” in school had made me oblivious to its failures and inequities.

Many students, as they journey through their experiences in school, come to a change in heart: ‘They fail me, but I fail them.’ Alternative pedagogies, with their experiences of playing ‘gaming’ around a multiplicity of worlds, can give communities of practice the “gaming” moment to reveal to their students, and to themselves, how new community of practice discourses and world practice can work on the cultivation of identities.

We need, in essence, pedagogies of science play.
inequities. When asked what schools would look like if they took success for everybody as their point of departure, I was clueless. I had never considered how schools might be different. My lack of response, Concha pointed out, was a luxury. Many students go through schools with a daily awareness of what isn’t working in their experience and a desperate desire for change. In response, they try to create change in their experience in whatever ways they can, including dropping out of a failing system that has systematically passed that failure along to them. Alternatively, they work to construe conditions within the system that make their experience more enjoyable. They develop, returning to the discussion of students’ multiple worlds that began this section, strategies for crossing from their home communities into the classroom communities of school. In this way, they are “gaming” school, looking for collusion-moments in which they can, albeit momentarily, take charge of the learning situation and maximize its status in their appreciative systems. The language play I will document of Mexican adolescent newcomer youth, generated out of, as I describe below, a culturally-rooted discourse practice, is one such strategy of “gaming” science.

WAYS WITH WORDS: THE ETHNOPOETICS OF MEXICAN DISCOURSE

Heath’s (1983) ethnography of language socialization in two (White and Black) working class Southern communities drew important attention to how teachers stand to benefit from knowledge about students’ different “ways of talking, knowing, and expressing” (p. 343). In her 1996 epilogue to the fourteenth edition, Heath maintains the enduring integrity of the idea of “bridging” classrooms and communities, but acknowledges that our understanding of “the span of the bridge” (p. 376) will necessarily need to vary in accordance with changing contexts and circumstances. Because the bridge I am interested in building spans students’ Spanish language socialization in their home communities in Mexico and their English language and science learning in classrooms in the U.S., a knowledge of Mexican discourse characteristics must be at its foundation.

The ability to use language artistically and persuasively,” writes Briggs (1988), “is a central concern in Mexicano culture” (p. 231). His research in New Mexico, as well as that of Guerra (1998) and, more recently, Farr (2006) in Chicago, documents the way that Mexican communities place value on “verbal artistry” with the spoken word (Briggs, 1988, p. 2). “Joking” as one form of such artistry is documented in each scholar’s account. Briggs (1988) has an entire chapter (“Jests, Anecdotes, and Humorous Tales”) on chistes (jokes) as a “crucial dimension” (p. 171) of Mexicano [speech] performances. Guerra (1998) describes joking as a critical component of the Mexican narratives he studied, and Farr (2006) details how chistes make up the larger cultural practice of relajo, language which serves the purpose of play. These scholars agree that joking is more than mere frivolous activity. In terms of technique, joking serves as a relatively low-tech, low-stakes means for individuals in a culture that values verbal artistry to demonstrate their competence with language (Briggs, 1988, p. 231). In terms of function, the pay-off for a good joke is high; it helps members of the
social group bond more closely (Guerra, 1998, p. 83), while providing, as Farr (2006) describes, a transformative experience that “turns the social order upside down” (p. 238).

Inverting the social order entails exposing the arbitrary basis of social power (Paolucci & Richardson, 2006) and, in this way, jokes provide an important social adhesive in Mexican culture. For a community that has historically borne the exploitation of the U.S. labor system and the accompanying deficit stereotypes associated with its rung on the U.S. race hierarchy ladder, the reality play provided through joking serves as a critical mechanism for coping with marginalization. The students whose language play I feature were assailed by ketchup packets in the cafeteria by white peers. They lived knowing that their teachers assumed many of them were in gangs. The school and community perception was that these youth were only in school to bide their time until taking up work on the plant line. This was the lived reality with which these students' language play played. It did so, not via soapbox performances, but through quiet, seemingly benign events, taking place at the periphery of formal classroom instruction. Students would, as Farr (2006) describes, *echar relajo*, or toss some play into instruction and, in so doing, not only practice the kind of verbal artistry valued in their home communities, but establish their social bond, and comment, I argue, on the contact zone of their particular science classroom.

**The English Learner Science Classroom**

Linda Crabtree was the teacher of the “English Learner Science” classroom at Captainville High School in Captainville, Iowa. She moved to the community 11 years ago after having taught 11 years previously in another (non-EL) Iowa context. Her professional training as a teacher had not prepared her for work in an English Learner science context. She was not specially trained in the content area of science or in work with bilingual or ESL populations. As she put it, she had taken “some courses” on instructional strategies for English Learner students. But because of missionary work in South America, Linda had what many staff at the school did not – basic proficiency in Spanish. This skill lent her great authority over English Learner education at Captainville High, an authority she used to develop relationships with students that other staff, because of their lack of this skill, found easy to ignore.

Linda understood her goal in the English Learner Science course as being that of preparing students for the language they would encounter in the Earth Science course to which, ideally, they would be mainstreamed the following year. The majority of her students were Mexican newcomers to the U.S. who spoke little to no English upon their enrollment at Captainville and in her classroom eight months previously. There were, in addition, a handful of students who fell outside of this profile: one student had recently immigrated from Sudan, another had returned to Captainville after spending time back in Mexico and was taking the course again in an informal role of “teaching assistant,” and a few others were “behavior placements” – students the mainstream science teachers found too difficult to manage.

The ex...
The existence of these outliers is important because it tells us something critical about the role of the English Learner Science setting at Captainville High. The course was the default placement for students the science staff at the school didn’t know what to do with. Once placed in the course, the curriculum and instruction these students received were not overseen by science staff; Linda had complete control. While she did the best she could with the “sheltered instruction” training she had received and was well aware of her limited skills in working with the English Learner population, her adoption of some of the teaching strategies she had learned was problematic. She, for example, taught the course in a random mixture of (often inaccurate) Spanish and English, despite the presence of a Sudanese student for whom this must have been immensely confounding. The combined factors of a non-science specialist teacher operating outside of the purview of the department with limited training in providing English Language Development construed the English Learner Science course as a marginal formal learning space. The location of the classroom in the “EL Wing” of Captainville served to solidify this marginality and isolate Linda and her students from getting what may have been important science teaching and learning support.

The data I have of students’ language play comes from a larger exploratory study of explicit academic language instruction in science of which Linda’s English Learner Science classroom was one focal site. I videotaped Linda’s instruction over a one-month period at the end of the school year (April-May). The videotaped observations documented Linda and her students engaging in one lesson of a rock cycle unit (Richardson Bruna, Vann, & Perales Escudero, 2007), and four lessons of a body systems unit, two of which involved the actual dissection of fetal pigs (Vann, Richardson Bruna, & Perales Escudero, 2006; Richardson Bruna & Vann, 2007; Richardson Bruna, 2007). My interpretation of the data has been informed by my subsequent long-term ethnographic work in this school and community, including the originating “sender” community in Mexico, as well as a review of the literature on Mexican discourse practices in which I came to recognize the language play I had witnessed as part of a larger meaningful cultural practice.

The videotaped observations of the English Learner Science classroom yielded five transcripts, produced through the transcription and translation efforts of a graduate research assistant who is native to Mexico. In reviewing these transcripts, I first coded any student-initiated humorous utterance. When I looked across the different kinds of utterances, I then began to further code them according to the domain in which they played with language: phonological (the sound system), semantic (the word meaning system), morphological (the word formation system), and discursive (the text connection system). I then used the coded transcripts to identify segments to return to in the videos. I watched these video segments to gather basic contextual data, like the nature of student or teacher interaction proceeding or following the humorous utterance, that provided important interpretive information. Finally, I applied to each example of language play an analysis informed by Fairclough’s (1989) three levels of critical discourse analysis. I described the text of the humorous utterance itself (the micro level), I accounted for its purpose by interpreting the relationship between the utterance and the interaction from which it
emerged (the meso level), and I attempted to explain its meaning, exploring the relationship between the interaction and the larger classroom, community, and social context (the macro level) (Fairclough, 1989, p. 26). In what follows, I first present, in one section, a narrated description of the language play as it unfolded, with bolded examples, and then combine my interpretation and explanation of those examples in a second section.

The reader will note that all the examples of language play I describe here were produced by males. I ascribe this to the traditional Mexican cultural norm that women, in gender-mixed public settings, yield the floor to men. This was my experience in Linda’s classroom; the female students were much less vocal than their male peers. These female students, did, however, engage in their own kind of non-vocal language play that I describe through the actions of the “tagging trio” in Richardson Bruna (2007). While gender-based modes of classroom participation is a topic of significant import with respect to the effective instruction of Mexican newcomers, regrettably, it falls beyond the scope of this chapter.

LANGUAGE PLAY AND SCIENCE LEARNING: THE ROLE OF METER, METAPHOR, AND MOOD

For the purposes of my discussion in this chapter, I will take the distinguishing feature of the (male) students’ language play I document here to be enacted attention to two poetic devices: meter and metaphor. I use “meter” to refer to the verbal rhythm and rhyme of an utterance. I use “metaphor” to refer to a comparison made between one object and another by speaking of them as if they were the same. Students’ enacted attention to meter and metaphor through their language play helped comprise the mood, which I use to mean the particular attitude or feeling, of this particular instructional setting. Here I limit myself to examples from the phonological (meter-based) and discursive (metaphor-based) domains of students’ language play in the second, third, and fifth of the five videotaped and transcribed observations and showcase, within those respective domains, students’ active and creative play as they collude to learn in the contact zone of their English Learner Science classroom.

Before I begin, it is necessary to provide a bit of background information about the nature of the activity in which students were involved during the observations from which the following data come. The second, third, and fifth transcripts document Linda’s set-up of a pig dissection activity as part of a larger body systems unit (Observation 2), the students’ actual commencement of that dissection (Observation 3), and their wrap-up and consolidation (Observation 5). Two important tenative themes emerge at the beginning of this activity (in Observation 2) that are critical to my interpretation of the language play across subsequent transcripts: 1) Linda’s understanding and explicit articulation to the students that the pig dissection is preparation for their presumed future work at the plant; and 2) students’ understanding and explicit articulation to Linda that the pig dissection is physically repulsive and ethically questionable. Because I treat these themes exhaustively elsewhere, I mention them here to simply set the stage for the language play that follows (for a thorough analysis, see Richardson Bruna & Vann, 2007).
Description of Language Play

It is Friday, the first day of the pig dissection unit (Observation 2). Linda is standing at the front of the classroom, behind a glass-encased model of a fetal pig that she has placed on the table before her for all students to see. Because the students had been studying body systems and Linda wants the dissection to assist them in observing the body systems of a pig, Linda uses the glass-encased model to review key body systems concepts and vocabulary (circulatory, respiratory, nervous, skeletal, etc.). At this moment, she wants students to come up front to view the model more closely. She calls Eduardo to the table. He seats himself in front of the model and listens while Linda proceeds to point out the different parts of the fetal pig. She refers to the different parts by number, as they appear on a worksheet she has given the students. When she fumbles in pronouncing the word “aorta” with the word-initial lax “a” of its Spanish pronunciation, one student and then another use the opportunity to make a meter-based nonsense rhyme:

Linda: Uno. la torax. dos [one. the thorax. two]. the upper veins. viste [did you see?]. es lo más importante que nosotros tener aquí [aorta] (stumbling over the pronunciation) [did you see? It is the most important thing we have here a a ort aorta]3

Juan: Aorta torta [aorta sandwich]

Julio: Corta una torta [cut a sandwich]

Ss: (laughter)

Linda: (continues to call out the numbers and names of different organs)

It is Monday, the second day of the pig dissection lesson (Observation 3). Linda gives the students fetal pigs and asks them to tie the pigs against dissecting trays so their legs are splayed backwards, facilitating the center cut and subsequent examination of body parts. The reluctance students expressed on Friday is physical. As the pigs come out of the large plastic tub, the sight and smell of their small, limp, gray bodies and the smell of the chemical in which they have been preserved, produces revulsion. This is expressed by a heightened activity and noise level. Students vocalize their disgust — “uuhhh!” — and hold their noses, turning their faces away from the sight. Linda works to call the students to order and begins to show them how to get the pigs ready in the trays and how to tie their legs back with string. The expressions of revulsion turn into an uneasy laughter at the sight of Linda tying back the pigs’ legs. The following excerpt begins with Linda’s admonition for them to regard the activity as work and not play:

Linda: (Standing at the left-hand side of a row of desks that have been pushed together to form a table) Este no es una trabajo. Este no es un juego. [This is not work. This is not a game (correcting herself).] … You’re going. EXCUSE ME. Gentlemen. (holding up a ball of string and cutting while she is talking) you’re gonna take two long pieces of string. With the first one, you’re gonna tie it around. You’re gonna tie it to the front leg, and then you’re gonna tie it tight - tight (using student’s pig to demonstrate) under. See guys? . Then
you’re gonna do the same, to the back legs. (giving student more string) ok? Pedro (addressing a student sitting in front of her and handing him some string), you’re ready. mirar que yo hice [look at what I did]. So you want two pieces ...."

Anonymous Male Student: (off-camera) ¡Two pizzas!

Linda: Not pizzas (shaking head)

Ss: (laughter)

Linda: Take two halves...

Marco: ¡La passion del puerco! [The passion of the pig!]

(There is a bustle of activity as students argue over who gets the bigger and littler pigs and who will form partners with whom.)

Alberto: Traeme una motosierra ¿no? [Can’t you get me a chainsaw?]

(Students being to settle down and Linda begins describing how and where to make the cut. Students begin to make cuts of their own.)

Marco: ¡Compre los tacos! ¡Compre los tacos! (Buy tacos! Buy tacos!)

(Students continue with the dissection. There is a lot of student side conversation as they tease each other about the work they are doing. Linda moves around the room engaging students in instructional questions about the different body parts they are seeing.)

Joel: ¡Hey sapo! ¡Nos hechamos la cabeza p’hacer pozole! (Hey toad, let’s cut off the head to make pozole!)

(Linda continues moving around the room pointing out the pigs’ body parts until it is time to clean up.)

Maria: Uyyyy. Me voy a enfermar (Uggh. I’m going to get sick)

It is the following Friday (Observation 5). At this point in the class, students have completed the pig dissection activity and Linda’s goal is to consolidate what they have learned about body systems. She asks them what they were able to deduce about body systems before they even cut the pig (that because the pigs had noses, for example, they must have had a respiratory system). When the discussion turns to the nervous system, Augusto offers the evidence that pigs “cry or something” (presumably, he means “squeal”). Linda, taking up students’ expressed concerns over the ethics of the pig dissection (Observation 2), emphasizes to the students that these pigs never cried because they were never born. She explains again that these pigs were never killed—they were removed from the stomachs of the pregnant sows (who themselves were killed) before arriving at the plant for butchering. This reminds Augusto of his experience working with cows in Mexico and he tells a story about his family inadvertently killing a cow they didn’t know was pregnant until they saw the calf inside her. A student, joking, asks Linda why she didn’t warn them about the cow (they are students hunting season is December and they can only catch antlers.

Linda: (going on) because you can only the head goes or

Augusto: Traeme el marido

Linda: ¡No!”

Augusto: No, me traes el marido

Linda: ¡Noooo!

Ss: (Laughter)

Linda: No puedo traer el marido.

Augusto: (Augusto and Maria continue arguing)

Linda: Tira los tacos de esta mesa

Augusto: (Augusto and Maria continue arguing)

Linda: (Augusto and Maria continue arguing)

Maria: Uyyyy. Me voy a enfermar (Uggh. I’m going to get sick)

It is the following Friday (Observation 5). At this point in the class, students have completed the pig dissection activity and Linda’s goal is to consolidate what they have learned about body systems. She asks them what they were able to deduce about body systems before they even cut the pig (that because the pigs had noses, for example, they must have had a respiratory system). When the discussion turns to the nervous system, Augusto offers the evidence that pigs “cry or something” (presumably, he means “squeal”). Linda, taking up students’ expressed concerns over the ethics of the pig dissection (Observation 2), emphasizes to the students that these pigs never cried because they were never born. She explains again that these pigs were never killed—they were removed from the stomachs of the pregnant sows (who themselves were killed) before arriving at the plant for butchering. This reminds Augusto of his experience working with cows in Mexico and he tells a story about his family inadvertently killing a cow they didn’t know was pregnant until they saw the calf inside her. A student, joking, asks Linda why...
she didn’t bring them a calf to dissect. Linda replies by talking about how her son (they are a family of hunters) had, in fact, suggested they kill a deer for the students to dissect. This piques Augusto’s curiosity. He wants to know when deer-hunting season is and why a specific season is designated. Linda explains that by December the deer born in spring are old enough to live alone. Augusto is sure that only the hunting of males is permitted. Linda explains that this isn’t so:

Augusto: Really?

Augusto: How do they do it then?

Linda: This time of year you can’t tell which is a male and which is female because every year the males lose their antlers and their antlers have to grow back (Linda repeatedly nods to underscore the truth of what she is saying.)

Augusto: Seriously?

Linda: Seriously (continuing to nod)

Augusto: Every year?

Linda: 

Augusto: Los venados pierden los cuernos. [The deer lose their antlers.] 

(Augusto is translating for his peers.)

Linda: Todos los años, esto es porque si tú caminas golpearias muchos árboles. Es fácil de para mirar [And every year this is because if you walk you will hit many trees. it is easy to look] (Presumably she means the deer can move their heads more easily to look around without antlers.)

Augusto: I know why

Linda: Why?

Augusto: Las esas les ponen los cuerños con otro [The women put their antlers on another.] (In Spanish, to say a woman “pone los cuernos a su marido” [puts horns on her husband] means she has cheated on him.)

Linda: (staring at Augusto for a few seconds while she thinks this through.)

Linda: Nooo

Ss: (Laughter)

Linda: OK. We said. We said that our baby pig had a circulatory system (She goes on to review the body systems they had discussed.)

**INTERPRETATION AND EXPLANATION OF LANGUAGE PLAY**

**Example 1: “Corta una torta”**

In meter-based language play, it is the syllabic structure of a word or phrase, in combination with phonological elements, that is observed and or manipulated to humorous effect. In the “corta una torta” excerpt from the second of the transcripts,
we see how Linda’s fumbling with Spanish draws attention to the phonological domain and how students take advantage of the opportunity to engage in language play.

The trigger of this act of language play is the difficulty Linda has in pronouncing the word “aorta” in Spanish. Her repeated attempts produce a series of utterances – a. a. ort. aorta – in which the word-final “a” of the third utterance (“ort”) is closely-enough followed by the word-initial “a” of the fourth utterance (“aorta”) to produce the sound sequence [ortaorta]. Juan capitalizes upon the similarity between the “orta” segment of this sequence and the word “torta” (“cake”) in Spanish and makes a joke about an “aorta torta” or an “aorta cake.” Julio seizes the moment by building upon both the meter and meaning of the rhyme. He adds another two-syllable word, “corta,” to the beginning of the string to rhyme with both “aorta” (the word-initial “ao” are closely joined) and “torta.” Through this work, he achieves the statement “cut aorta cake,” which expands Juan’s earlier humorous comment and garners him some laughs from his Spanish-speaking peers who understand the joke. Their shared laughter construes their identity as an affinity group (Gee, 2000–1) in the classroom and positions Linda, who does not laugh or respond (perhaps because the joke was made at her expense), as an outsider.

What is the relationship between these acts of language play and the larger community and social context? Students’ awareness of Linda’s limited Spanish (which served as the play-trigger) can be read, I believe, as a commentary on the lack of infrastructure that exists in this community to meet the needs of its newest students. While the fact that Linda speaks some Spanish is undoubtedly helpful in allowing her to develop relationships with students when other staff cannot, her abilities instructionally with Spanish, given she is teaching in a content area with a highly specialized vocabulary, are severely limited and limiting. Students experienced a ceiling effect in their English Learner Science classroom, an awareness of their teacher moving outside of her content and language comfort level. The moment in which they play with her fumbling over the word “aorta” is one of many in the data where they comment on or, in cases, directly or indirectly correct her. These moments subvert traditional authority structure in the classroom by positioning the students, instead of the teacher, as the expert. These Mexican newcomer students, I argue, were cognizant that they had been placed in a classroom with a “non-expert” teacher and that this reflected their status on the physical and social periphery of the larger student community. Making jokes at the expense of their “EL Science” teacher would, in effect, be a commentary on their marginalized role in the school as a student population whose needs the school is inadequately meeting.

Example 2: ¡Two Pizzas!

Like the previous example, we see in the “¡two pizzas!” example how a student comes to a spontaneous phonological insight: the phonology of the English word ‘pieces’ and the Spanish pronunciation of ‘pizzas’ are similar. Since the first
syllable of both words consists of the high, front, spread, tense vowel [i] (as in 'seat') and since, in Spanish, 'z' is pronounced as [s], these words differ only in the vowel of their second syllables: the English word 'pieces' contains the mid, back, spread, lax vowel [ʌ] (as in 'suds'), whereas the Spanish word 'pizzas' contains the low, back, spread, lax vowel sound [a] (as in 'sod').

The humor of this act of language play lies in the context in which the word “pieces” has been uttered. The import of Linda’s instructional statement, “So you want two pieces of string” is significantly altered if the word “pizzas” is substituted: “So you want two pizzas.” The juxtaposition of these two possibilities - wanting string (to tie the fetal pig’s legs back, which clearly disgusts them) or wanting pizza (to eat) – underscores the difference between the formal and, on this day, physically uncomfortable domain of the English Learner Science classroom and the informal, more pleasurable domain of home and community. Presenting his peers with the possibility that Linda is telling them they want two pizzas (in the midst of pig dissection preparations) provides a kind of reality play that marks, again, their shared position – this time, not as members of a language-based affinity group, but as unwilling participants in this imposed and, to them, revolting activity.

To expand, this interaction is the first humorous one following Linda’s admonition of the students’ noisy behavior so it serves at one level to lighten the tone of classroom interaction and diffuse the power behind her disciplining “This is not a game. This is work.” remark. But, contrary to Linda’s explicit framing at the start of the pig dissection unit that the activity should be interesting to the students because their families cut hogs at the plant (see Richardson Bruna & Vann (2007) for a comprehensive analysis of this framing), the students are not eager to engage themselves in the pig dissection work. On a physical level, they are noticeably disgusted and, on an emotional level, they are confused about why Linda is “wasting pigs.” Being forced to do an activity that they find repellant and, further, doing it under the guise that it is appropriate (to their presumed futures as low-status workers in the community), positions these students in powerless social roles (both within the classroom and without). Through this example of language play in which a student highlights the juxtaposition between what Linda wants them to want -two pieces of string- and what they themselves would prefer to want -two pizzas- we see how a student both comments on and exerts power over what for him is an unfavorable learning situation. And he does so in a way that, while continuing the ongoing critique of the pig dissection activity, complies with Linda’s admonition that the students, at least physically, settle down.

Example 3: The “pasión del puerco” series

With metaphor-based language play, the focus shifts from the more micro level of the sound system to the more macro level of social texts. Students invoke humorous connections and comparisons between one text and another. At this level, here we see the invocation of two metaphors as the students go about the work of the dissection. One, “la pasión del puerco,” is a textual connection
between the fetal pig dissection and Christ’s crucifixion. The image of the pigs’ legs tied to the dissecting pan invokes a strong textual connection to the image of Christ on the cross. Marco’s “pasión del puerco” comment continues to construe the pig dissection as a cruel event. Because the press hub around Gibson’s movie “The Passion of Christ” revolved around its bloody representation of Christ’s punishment, his textual connection serves to assert that the pig dissection is similarly gruesome.

The other metaphor is constructed through a string of metaphors involving “motosierras,” “tacos,” and “pozole.” These are textual connections between the act of fetal pig dissection being done in the science classroom and the act of hog packing that is done in the plant. Remember that Linda has made a connection herself between these two activities in announcing the pig dissection activity. Alberto’s request for a chainsaw can be read as a request for a “whizard,” the electronic slicing knife used to cut meat at the plant (Fink, 1998). In this moment, he is making a connection between the image of himself in the classroom cutting open a fetal pig and the image of himself at the plant, with a whizard, cutting a hog. Similarly, Marco and Joel’s references to tacos and pozole (two traditional Mexican dishes using pork) continue this metaphorical work by referring to the fetal pig to be dissected as the source of food product. This is a logical take-up of Linda’s framing of the pig dissection as preparation for work at the hog plant, which produces much of the pork the nation consumes.

In doing their metaphorical work, students continue to use humor to gain ownership over the dissection activity. From the beginning, students have expressed reluctance and distaste which Linda has tried to reduce by repeating to the students that the fetal pigs were never “alive” and they didn’t experience any pain. Yet concerns over the origin of these pigs and the waste of life they represent plague the students. Marco’s connection between the dissection and crucifixion encapsulates (albeit playfully) their take on the activity as a gruesome event. Also, from the beginning, students have been cued to see themselves in relation to the pig dissection, not as scientists drawing on knowledge of body systems (members of an elite information economy), but as butchers producing meat for consumption (members of an exploited service economy). Alberto, Marco, and Joel take up this cueing, enact it humorously, thus “owning” it and defusing its destructive power—the symbolic violence it does to their social and academic identities in the Captainville high school and community.

Example 4: “Las esas les ponen los cuernos con otro”

What is striking about the final example is that Augusto sets up his audience for language play. On the tail of Linda’s attempt to explain why deer lose their antlers in winter (so they can walk through the trees and more easily be able to see), Augusto tells his audience he has another explanation (“I know why”). Linda’s follow-up question “Why?” brings Augusto’s audience to their edge of their seats, so to speak. He has laid the groundwork for the timing of his delivery. In this way, the example stands out among others in providing an explicit marker that the classroom conversation is alerting laughter. One of Linda’s students, Augusto’s, has managed to create an explanation that are both humorous and clever. Like the image created by one deer (her “husband”) adding a second horm (her “husband”) to the herd, these elements of each other play into the cultural betrayal in which the hegemony considers them.

Taken together, Linda and Augusto’s language play offers insights into students’ interactions with each other and with the instructor. These relations of peer-to-peer language play reflect cultural markers of their ethnopoetic crossings. For Linda and her students, these instances of language activities were not made up, but rather because it was in the students’ culture (p. 43). They were contextualized and facilitated against the cultural variances of their language communities, in which much education and cultural and educational crossing is “gaming” style.

Gee (this volume) has critiqued the problem surrounding “gaming” in learning. This case study shows that cultural and social crossings in teaching provide opportunities for learners who have been historically projected to fail.
classroom dialogue is about to shift from routine informal instructional conversation (albeit, at this point, somewhat tangential) to language play. Augusto is alerting them he is about to echar relajo or toss in some language play. Students’ laughter after Augusto’s delivery affirms the performance as successful and Linda’s close-down of the dialogue from which the language play emerged, achieved through her abrupt return to formal classroom instruction, provides the final curtain.

The complex joke Augusto delivers in this performance draws from a metaphorical connection between a literal text of the physical world (the idea of deer losing their antlers) and the literal text of a metaphorical world (the idea that women put horns on their husbands); as such it is, really, a meta-metaphor. In Augusto’s formulation, the deer horns that are being lost in winter are the horns that are being placed on the cuckolded spouse (that is why they are lost). The image created is of female deer – “las esas” [the females] – taking antlers off of one deer (her lover), who, in this way, loses them, and placing them on another (her “husband’). It is an absurd, hence humorous formulation that blends iconic elements of both cultures. Deer hunting in Iowa gets all mixed up with amorous betrayal in Mexico in a way that, for a moment (note Linda’s pause as she considers the joke), makes the (now “upside down”) world stand still.

Taken together, the examples I have provided here reveal how students use language play to construe a hybrid discourse community in the science classroom. In the contact zone of this classroom where “cultures meet, clash, and grapple with each other,” they do so, as Pratt (1991) further notes, “in highly asymmetrical relations of power” (p. 3). Mexican adolescent newcomer students’ use of language play reflects, I suggest, a rich oral tradition in which humor has developed as a cultural mechanism to cope with this power asymmetry. Drawing on an ethnopoetic sensibility they have inherited from their family and community, these students, to invoke Lugones, carry themselves through their science classroom activities with a playful attitude that “turns the activity [even if and perhaps because it is physically and ethically repugnant, like the pig dissection] into play” (p. 43). The playful mood of “being creatively and actively in the moment,” facilitated by a shared oral tradition, serve to reinforce their group solidarity against the institutional authority of school embodied by their teacher. Through their language play, students construed themselves as an affinity group (Gee, 2000–1) in which members bonded over the common endeavor to make room for their cultural and linguistic identities in the science classroom and thus ease each others’ crossings between this world and the world of home. In this way, they were “gaming” science.

Gee (this volume) offers us the vision of science classrooms as goal-driven problem spaces that provide students meaningful, authentic contexts for situated learning. To these ideal goal-driven problem-spaces students will bring along their cultural and linguistic differences and, in fact, bring about differences, as a result, in teaching and learning (Koole, 2003). Students’ appreciative systems as science learners will be affected by the degree to which they feel that, in taking on the projected science identity of the goal-driven problem space, they do not need to
give up, wholesale, important aspects of their lives; they need to sense that room is being made both for the brought-along and brought-about differences. Since appreciative systems are formed through a synthesis of the affective, cognitive, social, cultural, and personal (Gee, 2003, p. 97), it is important for educational researchers to know more about the nexus of these and how they are put into play in science learning. Here I suggest that the mobilizing of a playful mood by Linda’s students via their use of ethnopoetic strategies involving, for example, meter and metaphor, is a case where we can glimpse students’ emotional (affective) response to a learning (cognitive) task as a (social) identity-project rooted in a shared (cultural) discourse deployed strategically by individuals to achieve (personal) rewards – in this case, those associated with the value of verbal artistry. Gee’s goal-driven problem space would need to have the capacity to accommodate this value to have a favorable appreciative outcome for these students. Its pedagogy of science play would need to attend to their word ways.

LANGUAGE PLAY AND CONNECTED SCIENCE

To be clear, the purpose of this chapter is not to reinscribe U.S. Mexican students as non-academic “jokesters,” but to illuminate the different form that “talking science” (Lemke, 1990) can take among a particular culturally- and linguistically-diverse student community in U.S. schools. Newcomer Mexican students are travelers along the triple-threat border of, more generally, American culture and the English language, and, more specifically, the American school and science culture, including those specialized languages. The way these adolescents playfully engage with their border identity within the context of science instruction stands to reveal important information about the lived experience of cultural and linguistic hybridity in science teaching and learning and its implications for envisioning a science education agenda that, in a changing America, is truly for all.

Current theorizing about science education with diverse populations stresses the idea of connected science. “This way of approaching learning and teaching challenges teachers and researchers alike to assume that children are always connecting in some important way to the discipline and to learn to see these connections unfolding in the life of the classroom” (Warren, Ogonowski, & Pothier, 2005, p. 122). Connected science assumes that “the experiences, ideas, and ways of talking and knowing of children from groups historically placed at risk are productively related to those characteristic of scientific communities” (p. 122). My work challenges us to extend this approach even to strategies that, on the surface, may be easily misread as “acting out” (Hurd, 2004).

How ready are we to expand our thinking about science language and literacy to these kinds of hybrid discourse practices? If we take up Gutiérrez, Baquedano-López, Alvarez, & Chiu’s (1999) call to regard hybridity as a resource for learning, to understand such practices as “a systematic, strategic, affiliative, and sense-making process among those who share the code, as they strive to achieve mutual understanding” (Gutiérrez, Baquedano-López, Alvarez, & Chiu, 1999, p. 88), we must be prepared to embrace alternative forms of sense-making in science, such as
language play, that reflect histories of orality traditionally marginalized in science. As Rampal (1992) writes, “Science curricula, despite claims in the last decade regarding a progressive commitment to learner-centred approaches, have, almost ironically, relegated the predominantly oral universe of children, especially those from non-literate backgrounds, to a distinctly degraded subaltern status” (p. 239).

To counter the privileging of literacy that is part of the history of modern science will be, to say the least, difficult, but, if we take the call seriously, doesn’t “Science for All” (AAAS, 1989) demand it?

One place to start is in making teachers and teacher educators cognizant of the intimate link between the type of linguistic awareness indicated by, for example, these students’ oral language play and literacy. While teachers may recognize Mexican newcomers’ playful behavior, they may not fully grasp the work that, in particular, their language play may be doing. An interview with the mainstream Earth Science teacher (students take Earth Science following Linda’s “EL Science” course) is instructive on this point. He talks about the need for teachers to build a connection with the Mexican newcomer student population and notes that part of that connecting means creating a classroom environment in which these students can “interact with the teacher and be kind of joking but still be able to get some understanding, get some learning done at the same time” (Teacher Interview with George Roberts, October 10, emphasis mine). Embedded in this quote is a tension between play (the students’ “joking”) and “getting some learning done” that my research attempts to problematize. In the case of language play like that I have described here, the play is not in the way; play is the way. While Lugones’ concern is not about competence per se but about being creatively and actively in the moment, scholars, like Gee, maintain that through such creative and active work, competence develops.

The importance of play on children’s cognitive development is well-documented (Bergen & Coscia, 2001; Bergen, 1998). One kind of play in which children engage is, indeed, language play (Dunn, 1988, as cited in Gleason, 2005). Metalinguistic awareness, what scholars refer to as linguistic literacy, is its central feature. Linguistic literacy is, as Ravid & Tolchinsky (2002) define it, “the ability to consciously access one’s own linguistic knowledge and to view language from various perspectives” (p. 418). Children exhibit linguistic literacy when they demonstrate the ability to, for instance, adapt their language use in particular sociolinguistic contexts. Making these kinds of adjustments entails being aware of one’s own linguistic identity and the linguistic identities of others as well as being conscious of the linguistic (and cultural) features that distinguish both (Ravid & Tolchinsky, 2002, p. 421). An examination of linguistic literacy is important because, as Ravid & Tolchinsky describe it, “what children know or think they know at any step in their development functions as an interpretive system of what they are currently engaged in” (p. 419). They point out, “School-age children and adolescents continue to acquire new linguistic constructions and new functions for existing constructs within contexts that have so far not been of central concern in developmental psycholinguistic inquiry” (p. 441). Adolescent Mexican newcomers learning English in a science setting is one of these unexplored contexts that, given demographic trends, merits attention.
An initial suggestion to teachers in circumstances like Linda’s would be to regard students’ language play, not as noise at the margins of her instruction, but as evidence that they are with-it, attending to the very sound of science teaching in moments of imaginative engagement (Egan, 1992) resulting in displays of linguistic activity and creativity. Being cognizant of the relationship between orality and literacy, they could purposefully enrich and enliven the oral dimension of teaching through a storytelling (Montgomery & Kumar, 2000) or poetics (Walders, 2000) of science. And they can affirm students’ language play by reflecting it back to them as, in fact, Linda herself did do in the exchange with Julian that opened this chapter.

In that example, Linda artificially stressed the first syllable of the word “volcano,” knowing that this adjustment would produce a particular metered alignment with Julian’s “OK no.” Adopting her pronunciation in this way created an unanticipated and, therefore, funny rhyme that teased Julian for his defiance and poked fun at her power. Her use of language in this way and to this effect constrained a light-hearted mood that was very much in keeping, as I have shown, with students’ own ethnopoetic sensibilities and playful discursive practices. As such, it is a perfect example of students’ differences bringing about differences in science classroom practice. This is a phenomenon that ethnographies of communication with an interest in bridge building for connected science would do well to further explore and understand. Listening to how students collude to learn, how they teach their teachers and, in the process, enhance getting themselves taught, is one thing science educators and researchers can do, for “the increasingly heterogenous future that awaits us all” (Guerra, 1998, p. 5), to make ourselves ready.

NOTES

1 I am alluding to Lemke’s (1990) work in which he includes teacher admonition and student challenge as teacher and student strategies of control in his analysis of talk in science classrooms.
2 Here and throughout the chapter, place and people names are pseudonyms.
3 Here and elsewhere in the chapter, errors in Linda’s Spanish have not been corrected.
4 Animals are often used as nicknames in Mexico.
5 This is, for Marco, not a fleeting connection. The subsequent transcript (Observation 4) shows that he repeats this metaphor, this time in English, so we know it was compelling to him.

REFERENCES

WAYS WITH WORDS


This chapter is sad, if I may say so, and we do in school stupidity is often students, and some students, and sometimes immigrants the, and they poke engaged in critical.

Why, for how students could, a pig, they could float through their own part and, indeed, to there will always be (dead) pigs. But with which there are many.

Of course, schools are not learning. So learning where the is where the point.

I will use a learned and how the same game I famous for the package called PlayStation 3.

In our current disciplines and with complex...