Hip-Hop, the “Obama Effect,” and Urban Science Education

CHRISTOPHER EMDIN

Teachers College, Columbia University

OKHEE LEE

University of Miami, Florida

Background/Context: *With the ever increasing diversity of schools, and the persistent need to develop teaching strategies for the students who attend today’s urban schools, hip-hop culture has been proposed to be a means through which urban youth can find success in school. As a result, studies of the role of hip-hop in urban education have grown in visibility. Research targeted toward understanding the involvement of urban youth in hip-hop and finding ways to connect them to school often rest primarily on the role of rap lyrics and focus exclusively on language arts and social studies classes.*
Purpose of the Study: *The purpose of this article is to move beyond the existing research on science education by utilizing an ongoing study to interrogate hip-hop culture, its relation to the “Obama effect,” and the role of hip-hop culture in creating new possibilities for urban youth in science. The discussion of hip-hop in urban schooling is grounded in the concept of social capital to explain what makes hip-hop youth who they are and how this knowledge can become a tool for supporting their academic success. Specifically, the discussion is based on theoretical constructs related to hip-hop in urban settings, including social networks, identity, and realness and emotional energy.*
Research Design: *To explore the complexities of hip-hop and the impact of the artifacts it generates on urban science education, we examined qualitative data illustrating the enactment of hip-hopness or a hip-hop identity in urban science classrooms. Specifically, we examined the “Obama effect” and its connection to hip-hop and science education.*
Findings: *The findings indicate that when teachers bring hip-hop into their science instruction, certain markers of interest and involvement that were previously absent from science classrooms become visible. Especially, the examples of the Obama effect in urban high school*

Teachers College Record Volume 114, 020306, February 2012, 24 pages
Copyright © by Teachers College, Columbia University
0161-4681

science classrooms in this article illustrate that science educators can strengthen hip-hop youth's connections to school and science by consistently using the science-related decisions President Obama is making as opportunities to teach science.
Conclusions: *By engaging in a concerted focus on hip-hop culture, science educators can connect urban youth to science in ways that generate a genuine recognition of who they are, an appreciation of their motivation for academic success, and an understanding of how to capitalize on hip-hop culture for their identities as science learners. Such efforts can eventually lead urban youth to become "the best and brightest" in the science classroom and pursue careers in science-related fields.*

Hip-hop is the culture of urban marginalized youth. It is an amalgamation of the thoughts, words, and behaviors/actions of those who dwell in urban settings and have traditionally been marginalized from socioeconomic and educational attainment (Emdin, 2010a). It is also the means through which urban youth create and engage in activities, such as graffiti, breakdancing/b-boying (these two terms are used interchangeably), deejaying and rapping, that have been identified as major strands of urban youth culture (Chang, 2005; Forman & Neal, 2004). Despite the significance of hip-hop and the insights it provides into understanding how certain activities that urban youth engage in are reactions to being ostracized from education and the political process (Hill, 2009), hip-hop is more than a set of activities or an avenue for tapping into the affective dimensions of urban youth experiences. It is the chief means through which those who have been ostracized by society and devalued by institutions like schools share their experiences with others who have undergone similar experiences.

While hip-hop is traditionally associated with urban youth of color, it is the dominant culture among not just urban youth, but those who have been denied an opportunity to tell their stories about their life experiences. Hip-hop creates artifacts, such as rap music, which describe previously silenced phenomena like the closed set of heroes, rules, and career options for people across geographic contexts. In many cases, youth who report their views on the world through hip-hop discuss various issues related to teaching and learning through their expressions of the culture.

For students who have traditionally been marginalized in the education system, effective instruction must incorporate their interests, funds of knowledge (González, Moll, & Amanti, 2005; Moll, 1992), and ways of talking and thinking in their home and community (O. Lee, 2003; Warren et al., 2001). For urban educators who value a student-centered approach to instruction, and for those who discuss the significance of

understanding student lives in instruction, it is necessary to consider hip-hop in the teaching and learning of those students positioned and treated unfairly both within and beyond schools. This is the case because those who are other than the perceived dominant race or class, and those whose needs are not met in schools, find a release from their challenging lives through hip-hop culture. Unfortunately, educators and researchers who are not a part of hip-hop do not see its cultural significance, and only see it as commercial rap music. Consequently, they overlook the reporting of factual experiences in schools that youth provide through their varied expressions of hip-hop. Because many educators fail to value hip-hop culture, facts about how hip-hop youth view and experience schools have been excavated from discussions about urban schooling. This is the case even among educators who are proponents of teaching and learning that is focused on fostering inclusive learning experiences for youth. In essence, the inability of educators and researchers to see hip-hop as a culture hinders opportunities to meet the needs of the millions of youth who are consumers of, and participants in, hip-hop culture.

The challenges facing hip-hop youth, who have been overlooked in schools, have led to transformative work that explore the use of hip-hop in language arts and social studies classrooms (Morrell & Duncan-Andrade, 2002; Stovall, 2006). Linguistic significance of hip-hop in the education of marginalized youth has been explored in other academic work (Ibrahim, 1999). The purpose of this paper is to validate previous work that describes the potential of hip-hop for education while highlighting the fact that urban youth of color who are particularly ostracized from success in science can benefit from a focus on hip-hop as well. The paper sheds light on how society at large persistently devalues hip-hop, and how this devaluing has translated into a stigma that urban youth attach to schooling broadly and science learning specifically. We argue that this problem stems from unsuccessful attempts of urban youth to gain visibility in education and related fields, and the eventual choice to forego consistent efforts to be accepted in school in favor of engagement in hip-hop and a donning of what is perceived as an anti-school identity. We also argue that this devaluing of urban youth culture and its offshoots – low educational attainment and the absence of Black and Latino/a youth in careers in science – can be addressed by refocusing on hip-hop and its value for education. We address issues related to urban science education both through the lens of urban youth and from the perspective of scholars within the field of hip-hop based education. Our goal is to find ways to successfully connect hip-hop youth to schooling broadly and science learning specifically. To meet this goal, we take a conceptual approach to hip-hop and urban science education, rather than present

an empirical study. This is the case because of the need for educators to develop a solid understanding of hip-hop and its nuances before using it as a framework for conducting research or improving practice (Dimitriardis, 2001).

We start by describing what hip-hop is and what it is not. Second, we discuss theoretical constructs related to hip-hop in urban education. The discussion is grounded in the concept of social capital to explain what makes hip-hop youth who they are and how this knowledge can become a tool for supporting their academic success. Third, we describe the connections between hip-hop and science, a school subject that does not appear to be associated with hip-hop (Emdin, 2010a). Fourth, for the purpose of exploring the complexities of hip-hop and the impact of the artifacts it generates on urban science education, we utilize the position of the first author as teacher and researcher who has witnessed the enactment of hip-hopness or a hip-hop identity in urban science classrooms. Specifically, we describe the "Obama effect" and its connection to hip-hop and science education. Finally, we discuss contributions of our discussion to the emerging literature on hip-hop culture in schooling and implications for improving educational practice.

WHAT IS AND IS NOT HIP-HOP?

What Is Hip-Hop?

Hip-hop includes such activities as graffiti, breakdancing/b-boying, deejaying and rapping that have been identified as major strands of urban youth culture (Chang, 2005; Forman & Neal, 2004). While each of these activities is a significant component of hip-hop, rapping is the activity that is most prominently associated with hip-hop culture because rap as a form of music has gained much commercial appeal. It is heard on everything from features on popular songs to car commercials. Consequently, rap is as easily accessible to those who are immersed in hip-hop culture as it is to those who are peripherally involved in it and only listen to the music.

As with other forms of music, there are certain forms of rap that are more commercial and consequently more accessible than others. The more popular versions usually involve superficial topics such as gross materialism, and the reinforcement of negative stereotypes that are generally associated with urbanness or Blackness such as gratuitous misogyny and violence. Thus, hip-hop is often perceived as a contemporary musical form that has a negative impact on youth. However, these perceptions of hip-hop are largely unfounded, and are a result of highly visible and

media-generated images of the culture. For many who are immersed in hip-hop culture, the messages that are pushed forth by this type of music do not reflect their culture. They identify other versions of rap as hip-hop music, which are more true to hip-hop culture, more reflective of the realities of the urban youth experience, and more lyrically complex than commercialized forms. In these forms of rap, topics such as education and politics, and messages for surviving the challenges of urban settings, are prominent.

In addition to its presence as the culture that gave birth to rap music, and the way of knowing and being of urban youth, hip-hop also stands as the chief mechanism through which populations that are not accepted into mainstream society, and who do not ascribe to distinct "western" cultural norms such as "appropriate" ways of dress or talk, find solidarity. Hip-hop becomes the banner under which they can form their own unique ways of communication that allow them to identify one another as collectively marginalized and outside of mainstream culture. Therefore, hip-hop is a means through which dimensions of social life that are typically classified as "lifestyle" becomes a significant part of a population's identity. For example, within hip-hop culture, modes of dress and talk that do not fall in line with traditional norms but align with hip-hop norms and guidelines hold much value. Through elaborate handshakes, subtle head nods, distinct walks, and unique hairstyles, participants in hip-hop send codes to one another that identify their collective ostracism from mainstream society and their connection to one another.

Through these codes, participants create networks with those who have a shared understanding of hip-hop modes of communication and then enact such modes of communication in social spaces where they come in contact with one another. These spaces are impromptu gatherings where a collective sharing of hip-hopness is expressed and then validated by others who are a part of the culture. An example of these gatherings is the rap cypher, where rappers gather in a circle and create social spaces where forms of hip-hop are expressed simultaneously in an unrestricted, yet orderly fashion. In rap cyphers, one person raps, while a crowd of others listen and then take turns rapping when the person currently rapping has finished reciting the verse. In these spaces, excited hand movements and head nods support the unrestricted and free flowing nature of hip-hop, while various verbal and non-verbal messages and cues that provide structure lead to the smooth functioning of the social spaces created. The entire scenario builds the connections among participants and develops hip-hop networks.

What Is Not Hip-Hop?

Unfortunately, there are a number of practices perceived or defined as hip-hop that are completely separate from it. These misperceptions lead to either an impression that hip-hop is simplistic and without much depth/complexity or a negative stigma that is associated with commercially visible and negatively themed rap music. For example, hip-hop is often described as putting together a bunch of words that rhyme or performing a rap. Those who engage in these practices are erroneously called by outsiders to the culture as "hip-hoppers" and are misidentified as representatives of hip-hop culture. In fact, the act of putting words together that rhyme is a practice that anyone can engage in and thus does not indicate a connection to or involvement in hip-hop culture.

Hip-hop is also perceived as a phenomenon that is only engaged in and created by "urban Black youth." Therefore, hip-hop is thought of as a phenomenon that cannot be engaged in, or utilized as a tool for learning by, those from backgrounds that are other than this group. This view is categorically un-hip-hop. Furthermore, this view suggests that when those who are not urban Black engage in hip-hop, they either do not hold a genuine hip-hopness or have a gross misunderstanding of the culture. Hip-hop does not exclude participants based on race, ethnicity, class, or gender. In fact, despite its prevalence in urban Black areas, hip-hop has historically been welcoming to all those who share their experiences as outsiders to mainstream culture or who are willing to explore the unique understandings of this population.

THEORETICAL CONSTRUCTS RELATED TO HIP-HOP IN URBAN SETTINGS

Because of the broad and largely unfounded descriptions and misconceptions of hip-hop culture, it is necessary to develop a framework for making sense of how and why participants in hip-hop become a part of the culture. This requires a sociocultural approach to studying the connections among the participants embedded within the culture. More specifically, this requires nuanced understandings of the concept of social capital as articulated by sociologists like Bourdieu (1985) and Coleman (1988). These scholars consider social capital to be the aggregate of social relationships when human capital and cultural capital is exchanged among individuals or groups. We utilize the concept of social capital as the fundamental piece of a larger framework to explicate what makes hip-hop youth who they are and how this information can become a tool for supporting their academic success.

Hip-Hop Social Networks

One of the chief characteristics of hip-hop is the strong ties that participants in the culture have to one another and the emotions that they exhibit towards one another. The first author has witnessed that these ties are particularly evident during the exhibition of hip-hopness or hip-hop identity in social fields where hip-hop youth exchange with one another (Emdin, 2009). The shared connections to hip-hop function to minimize ethnic or racial differences by allowing people from varying backgrounds to focus on conjoined experiences such as being socioeconomically disadvantaged or from a certain neighborhood, rather than their differences.

The connections among participants and the shared capital they exchange with one another create a strong affiliation among urban youth. Such affiliation is accompanied by their collective alienation from all persons or phenomena that do not accept them and that they perceive as not exhibiting characteristics of hip-hop (Emdin, 2009). Hip-hop can then be viewed as a mechanism for amalgamating the experiences of the collectively marginalized (that may be from otherwise varying groups), who do not fit in the societal category of the best and brightest, by allowing them to come together and create forms of social capital that are primarily interchangeable only with those who possess the same types of capital. These individuals form connections across social fields like different urban neighborhoods and housing projects, schools, or even classrooms that result in "dense networks" where they mutually benefit from coming together by shielding themselves from outside networks that alienate them (Fenster, 1995).

According to Coleman (1988), the dense networks created by those who have shared social capital result in scenarios where those within a particular network are so deeply connected to one another that the network is difficult to be penetrated by outsiders. He argues that within this network, trust is growing, and group needs and concerns as co-defined by participants are being met. Within hip-hop, participants who engage in practices that require trusting their peers, such as supporting one another in rap performances (Keyes, 2002) or working together to address issues like police brutality (Earl, Soule, & McCarthy, 2003), develop a deep connection to their peers that carries over into non-hip-hop fields. For example, in the first author's previous research, students under their connection to hip-hop develop dense networks in social fields like the playground or the neighborhood that can be expanded to non-hip-hop fields like the science classroom (Emdin, 2007). As a result,

students can maintain their hip-hopness while also being active participants in school science.

Social capital scholars refer to the process of penetrating an existent social network as the creation of structural holes in a dense network (Burt, 2001). In other words, it is necessary to be able to communicate with parties outside of a dense network where one is embedded in order to extend a social network. Burt (1992) defines structural holes as the result of breaches in existent social networks that allow for the development of more complex forms of social capital through the diffusion of information. For participants in hip-hop who are satisfied to co-exist with their peers in their dense networks, they see no value in expanding their existent networks to include social networks that they do not view as exhibiting hip-hopness. Inevitably, this will affect students' ability to connect to science. This is particularly the case when the culture of school science continually cannot find a means to penetrate the dense networks of hip-hop youth through existent pedagogical approaches.

Hip-Hop Identity

Turner and Stets (2006) consider identity to be the view of self that pushes individuals to behave in certain ways in their interactions with others. Turner (2002) also argues that individuals have multiple identities that include both core and role identities. Core identities are relatively stagnant and reflect a true self, whereas role identities are expressions of self that vary across contexts. This view of identity aligns with Burke's (1991) notion that each individual is made up of multiple identities that regulate behavior and allow certain forms of self to be expressed in different settings.

For participants in hip-hop, the multiple identities they hold guide the role identities they enact in social fields that do not value their identities. In classrooms where students' forms of capital are either devalued or misaligned to that of the teacher and the academic discipline, certain nonschool identities are formed. In these scenarios, certain behaviors or identity markers that reflect hip-hopness, such as expressing care for others and interest in the teacher's conversations, are not likely to be expressed. Instead, students enact role identities that include behaviors indicating disengagement or misbehavior. The interplay of core and role identities is related to the seminal research on "acting White" by Black students (Fordham & Ogbu, 1986). To maintain their identity in the Black community (core identity), the students form anti-school identity by actively resisting academic success (role identity).

The notion of identity described above is consistent with contemporary research in science education. For example, Brown (2004, 2006) and Buxton (2005) argue that identity conflicts may exist among youth of color when they attempt to form new identities as science learners. Urban youth encounter challenges in resolving differences between their core identities reflecting an interest in education and a deep commitment to hip-hop culture, their expected role identities as science learners, and their perceived hip-hop identities showing disinterest in education. In urban youth identity formation around school and particularly around science, confusion exists as to what parts of hip-hopness are expected to manifest in specific social fields. Urban youth fight to exhibit certain genuineness to their core identities, despite the structures in place within social fields like science classrooms that push them to exhibit role identities that are opposed to their desires to engage in learning science.

Realness: Hip-Hop Connection to Emotional Energy

Realness refers to one's adherence to hip-hop's core values such as trust or loyalty, even in the presence of general perceptions of hip-hop culture as inherently negative. For example, the unwillingness of participants in hip-hop to talk with police after a crime, which is part of a "no snitching" hip-hop ethos, is perceived by outsiders to the culture as senseless and irresponsible, whereas it is viewed by those who are a part of hip-hop as an expression of one's true connection to their hip-hop social network (Masten, 2009). For marginalized youth who live within an urban metropolis that ostracizes them from full participation in the financial/monetary exchanges that normally mark urban spaces, the value of non-monetary forms of capital becomes more significant than monetary capital.

As Homan (1974) discusses, the aim of the social group is to reward one another for compliance with what is jointly defined as a group mission in order to develop some aggregate result for each individual involved. In the case of hip-hop youth in schools, they "strategically and adaptively cultivate their social networks to maximize social and emotional gains" (Carstensen, 1992, p. 331). As individuals within a network have their needs met, positive emotional gains grow as joy, interest, and contentment are exhibited more readily (Fredrickson, 2001). Unfortunately, these social and emotional gains are often achieved as urban youth connect more densely to one another and alienate themselves more from schools.

For urban youth, there are beliefs about their lifeworlds that they hold

to tightly and are not open for modification by non-participants in their culture (Kitwana, 2001). The combination of being an ethnic minority from a lower socioeconomic group and a participant in a societally perceived lowbrow culture creates a scenario where one becomes socially and politically minoritized, or made to feel like one is part of a less valued and accepted group in school (Dei, Mazzuca, McIssac, & Campbell, 1995). Enduring processes that position one as being from or of a lower social class form characteristic ways of knowing, being, speaking, and interacting that define members of the social group as being less than the norm (Mukherjee, Mukherjee, & Godard, 2006). This process of minoritizing or being the minoritized and not being a part of the majority with "normal" ways of knowing and being describes the experience of hip-hop youth.

HIP-HOP AND URBAN SCIENCE EDUCATION

The basic argument that supports the work being presented here follows a certain sequence. First, the sciences and science education are traditionally presented as though they are only for the "best and brightest" (Holstrom, Gaddy, Van Horne, & Zimmerman, 1997; Zumeta & Raveling, 2002) without consideration that not all students are included in this category (Lopez & Schultz, 2001). Second, minoritized urban youth are highly underrepresented in the category of those assigned to being the "best and brightest" (Singham, 1998; Skiba, Chung, Wu, Simmons, & St. John, 2000). Third, minoritized urban youth who are not considered the best and brightest are deeply immersed in hip-hop (Ginwright, 2004). Finally, hip-hop is the means through which those who are not considered the best and brightest express their intelligence because they do not have the space to do so in urban classrooms (Emdin, 2010b).

It is important to consider hip-hop in the teaching of youth who we want to be engaged in science. This paper presents the dynamics that lead to the miscategorization of urban youth as outside of the best and brightest, discusses the ways that this misclassification has led to the development of hip-hop anti-school identities, and proposes how hip-hop (which has been previously forced to become a marker of being ostracized from school) can become a means to connect urban youth to school science.

Gulfs between Urban Youth and Science

Recent research in urban education reveals that entering spaces where students discover unexplored possibilities for their futures is an integral

component of honing student interest in school (Emdin, 2009; Guttierez & C. Lee, 2009). However, many minority students have never had an opportunity to see themselves as other than a caricature of youth of color (Fordham, 1996). The characteristics they exhibit as hip-hop youth, despite their potential to connect to science, often become liabilities when their potential for learning is not recognized. This creates an almost impenetrable border around who they are and who they can become.

Much contemporary urban science education research focuses on ways to help urban youth of color to become active participants in school science (Aikenhead, 1996; Calabrese Barton & Yang, 2000; Hammond 2001). This research has assisted in the creation of new possibilities for students who have traditionally been perceived as, and who may perceive themselves as, unable to do well in science (Elmesky & Tobin, 2005; Seiler, 2001). It also pushes a realization that the local contexts where many hip-hop youth are embedded do not provide examples of lucrative fields that provide viable employment (Anyon, 2009) and cause urban youth to see careers in science as outside of their reach. These issues are compounded by the fact that urban youth do not readily allow others who they perceive as the perpetuators of social, political or economic oppression to enter into their lifeworlds (Emdin, 2009). For example, if scientists are viewed as older White males in lab coats (Jones, Howe, & Rua, 2000) who have no connection to hip-hop culture, an association of science with hip-hop youth's previous negative experiences is likely to be reinforced.

The only recourse in getting students to move beyond the use of their hip-hopness as an affirmation of negative stereotypes about being other than school science, or to see science as other than a discipline that is for White males, is to attempt to make the science classroom a space that welcomes and values aspects of hip-hop culture that are traditionally seen as separate from school and science. In other words, the science classroom must become a place where the general characteristics that traditionally make up scientists or bright students are no longer the only criteria that apply. In the science classroom where traditional criteria for success are expanded, students become introduced to a world where they collaboratively define what it means to be a part of science. They do not have to enact role identities that position them to be other than science, nor do they have to avoid their hip-hopness. Students may enact the same hip-hop practices they do outside of the science classroom without being reprimanded. They may greet each other with head nods and elaborate handshakes, refer to rap songs while they engage in lab activities, or rest their safety goggles on the side of their heads while they wait for an

experiment to start (just like they wear their baseball caps outside of school). The expression of these practices in the science classroom serves as an indicator that hip-hop youth can become connected to the discipline. The task for science educators is to find ways to allow hip-hop youth to see themselves as a part of science in the urban classroom.

Why Is Science Not Hip-Hop? The Roots of Anti-Hip-Hop Science

One of the perceived “facts” that permeates the walls of social life into urban minoritized spheres and into the ideology of urban hip-hop youth is that the scientist is a White male who walks and talks in certain ways and exhibits distinct characteristics (Barman, 1996; Fort & Varney, 1989; Schibeci, 1986). In addition, urban youth of color are often perceived as speaking and interacting with high levels of emotion and distinct cultural markers (Smitherman, 1986, 2000). This leads to the general perception that the embodiment of certain characteristics associated with science, such as being reserved, objective, and “well behaved,” are categorically not urban, Black, or Latino/a. In essence, the ways of knowing and being of hip-hop youth have been labeled as anti-school and anti-science, and being urban, Black or Latino/a has morphed into a set of broad anti-school descriptions of hip-hop youth (Rose, 2008). Therefore, urban youth who see themselves as being hip-hop for reasons other than their disinterest in school are placed into a category where their exhibition of hip-hopness equates to a perceived inability to do well in school.

While hip-hopness, or the expression of a hip-hop identity, is perceived as anti-establishment (in this case anti-school), urban minoritized youth are simply making sense of the phenomena that we all experience from their own unique perspectives (Flores, 2000). Therefore, the pervasiveness of the negative associations between urban youth and hip-hop, and the long standing correlation of hip-hopness to a disconnection from science and school are unwarranted.

In regards to where the anti-school and anti-science labeling of urban youth comes from, we must first focus on the high position that science holds in society. The field of science education has always focused on developing students considered to be part of the highest intellectual echelon in the nation (Brandwein, 1955). These students who are part of the best and brightest serve as a reassurance to the nation that “we” will always have the talents to lead the scientific fight against the rest of the world. Unfortunately, the power given to science education to create and support the scientists maintains the perception that science is only for the best and brightest (Zumeta & Raveling, 2002). This is problematic for youth of color in urban settings who have historically been considered

not to be a part of the "best and brightest" but having learning and behavior problems (Skiba, Michael, Nardo, & Peterson. 2000).

This subtle yet powerful misclassification of students of color in urban settings as less than their counterparts from other racial and ethnic backgrounds plays out in academic discourse as the never-ending battle between achievement and race. This also highlights the poignant reality that misconceptions about the intellectual capability of urban youth of color have been indelibly marked into the subconscious of our nation. They have been inherited by our national system of education, local systems of urban education, and urban science education. As these dynamics play out and as historical misconceptions merge with present day ones, the end result is the exclusion of Black and Latino/a youth from school science. This exclusion results in the formation of, or adherence to, a hip-hop identity that often does not value school or science. As a result of being positioned as outside of the best and brightest, hip-hop youth exhibit a purposeful dismissal of school and science and a deeper immersion in a culture which allows them to be the best and brightest in social networks with their hip-hop peers.

In teaching urban youth, it is necessary to move beyond traditional modes of science instruction towards instruction that is willing to employ themes from hip-hop. This goal is met by focusing explicitly on aspects of hip-hop culture that are conducive to what science educators traditionally call for in the classroom. For example, since science educators call for active dialogue and even gestures (Crowder, 1996; Jimenez-Aleixandre, Rodriguez, & Duschl, 2000), the structures of dialogue found in hip-hop spaces like rap cyphers, which focus on both talk and gesture, can be brought into the science classroom. Science instruction should rely upon the nature of communication and the connections among those immersed in hip-hop as the starting point from which science instruction is delivered. This entails engaging the entire class or groups of students in a dialogue that is structured like rap cyphers – where students are positioned in a circle, each with equal opportunities to talk and work together to reach a shared goal. Such dialogue moves teaching and learning science forward and advances pedagogical practices.

OBAMA'S HIP-HOPNESS AND URBAN SCIENCE EDUCATION

In order to provide an example of how hip-hop responds to aspects of mainstream culture, we discuss a phenomenon that has had a tremendous impact on hip-hop youth, and that has the potential to ignite urban youth's interest in, and passion for, the sciences. We describe the "Obama

effect" as an example of how a phenomenon that exists in mainstream culture is re-interpreted and given a unique value in hip-hop culture. This "effect" is one of many that are birthed out of mainstream culture and that have different meanings when hip-hop youth connect to it. For example, phenomena like the war in Iraq or Hurricane Katrina take on different meanings related to race and class when discussed in hip-hop circles or mentioned in hip-hop music than they do in mainstream media.

The Obama effect is a term that developed in both educational and political circles to describe the effects of the President's run for office on different populations in the nation and globally. In educational circles, Dillon (2009) used the term to make sense of preliminary research findings indicating that President Obama's election and inauguration positively influenced the test performance of Black students. In political circles, Hertzberg (2009) used the term to describe the effect of President Obama's speeches on global participation in the political process. We define the Obama effect as the potential of Obama's presence and visibility to be a tool for sparking the interest and participation in previously closed fields among populations who resonate with the President's many hybridized identities. Those who identify with Obama because of his Blackness, biracial background, or hip-hopness see possibilities for themselves that previously did not exist. For educators who work with hip-hop youth in urban settings, Obama's presence can become a tool for connecting these youth to success in school.

Obama's Hip-Hopness

The first author has taught and conducted research in science classrooms with urban youth who are entrenched in hip-hop culture. The students have observed multiple instances where President Obama has exhibited patterns of behavior that resonate with their hip-hopness. On a broad and superficial level, the hip-hopness exhibited by the President can be tied to his background as a person of color born close to the time period between 1965 and 1984, a period defined by Kitawana (2002) as the advent of the hip-hop generation. On a more specific level, President Obama's hip-hopness is rooted in his exhibition of specific words, actions and behaviors that are distinctly hip-hop.

In urban science classrooms over the course of the primaries, the election, the inauguration, and the Presidency, the first author has had many conversations with high school students that revolved around the President and his hip-hopness. The first of these occurred when a 9th grade student ran excitedly into a biology classroom and asked me if I

had seen Barack Obama "dust his shoulders off" during a speech given over the course of the Democratic party primaries. The act of dusting one's shoulders off is a practice that was made famous by rapper Jay-Z, and is one that can be identified as distinctly hip-hop because of its prevalent use in hip-hop culture both before and after it was made famous by rapper Jay-Z. Along with expressions like "shaking haters off " and "dusting haters off," the act of dusting one's shoulders off signifies the dismissing of a worry, a problem, or a person who doesn't wish one well. For this student, the enactment of this gesture was the first time that he had seen a political figure, or anyone other than a recognizable participant in hip-hop, enact a practice that he perceived as having a significant level of connection to hip-hop culture. The use of this gesture on a national stage stood as a signifier of the hip-hopness or "realness" of Barack Obama in a way that was unabashed and indicative of his embracing of a hip-hop identity. For participants in hip-hop, this event also stood as validation of who they are to the world because of its open delivery and direct connection to their everyday experiences.

Another significant event that students identified as a hip-hop moment was when Michelle Obama gave Barack Obama a "pound" after he had clinched the Democratic nomination. The giving of a "pound" or "dap" is a bumping of the fists that is used as an indicator of solidarity, which is distinctly hip-hop in urban settings. For urban youth, this event was another validation of their hip-hopness that led them to see the President as a person who connects to hip-hop in a complex way more than simply putting together a bunch of words that rhyme (a practice that has been misnamed as being hip-hop).

A third significant expression of President Obama's hip-hopness that students noticed and discussed in school was the adjoining of hands in the shape of a two-handed "O" that many Obama supporters raised during the campaign. One of the students noticed this hand signal and excitedly shared the news with the rest of the class that Obama supporters were "throwing up the Rocafella symbol." The symbol of adjoining one's hands to form an "O" shape is seen in hip-hop when supporters of, and artists from, rapper Jay-Z's Rocafella Records show their connection to one another through what they call the dynasty sign. Although this Rocafella sign and the Obama sign may not be related, urban youth saw this gesture as an indicator that the President was with them. Essentially many urban youth believe that they have ties to President Obama through the connection to hip-hop that they share with him.

The Obama Effect and Urban Science Education

While the discussions of the Obama effect may lead to a more robust understanding of why and how people are spurred to action in various new activities because of the President, we argue for a concerted focus on developing ways to sustain its positive effects on the education of urban youth. More specifically, we argue that the Obama effect can be utilized as a means through which urban youth can be connected to science. This is important not only for African-American youth, but for students from other racial and ethnic groups both within and beyond urban settings who have been tracked into low achievement in science. However, because urban youth of color are most marginalized from science success and most entrenched in hip-hop, we focus on their connections to Obama and his hip-hopness.

For students who connect to multiple parts of President Obama's identities (like his African-Americanness and his hip-hopness), there is a willingness to discuss the President's decisions that are not at all associated with hip-hop. For example, the fact that Holdren and Lubchenco, experts on climate change, were selected as science advisors by Obama readily led hip-hop youth to engage in discussions about what it takes to be considered a science advisor for the President. In this case, it led to a student engaging in research on the topic and discussing it with the class. This connection between Obama and science also has the potential to spark urban youth's interest in and explorations of topics, such as the relationship between global warming and the earth's processes, the link between everyday actions and greenhouse gas emissions, and current issues that have scientific implications such as the BP oil spill. In addition, when Obama discusses the need to focus on evidence-based science (Bhattacharjee, 2008), or when he mentions his efforts to appoint individuals with strong science and technology backgrounds to key positions in his administration (Obama, 2009a), students who have formed a connection to the President because of his hip-hopness foresee possibilities for themselves to be either in those elite science positions or to be scientifically literate enough to be a part of the discourse.

In studies of urban youth in high school science classrooms over the course of several years, the first author found that successful initiatives to support their interest utilized hip-hop. When teachers brought hip-hop into their science instruction, certain markers of interest and involvement found in hip-hop cyphers like head nods and excited hand movements (that were previously absent from science classrooms) became

visible. Given the success of pedagogical approaches that incorporate hip-hopness into science instruction (Emdin, 2010a), and given the exhibition of the same markers of success when President Obama is discussed among hip-hop youth both inside and outside of the science classroom, it becomes apparent that a connection of science pedagogy to Obama's hip-hopness has the potential to be a tool for connecting urban youth to science. This is particularly the case given Obama's recent focus on the sciences and his belief that science is an integral part of a just and democratic society (Obama, 2009b).

The first author has observed that using integral pieces of the President's campaign that focus on science (e.g., cloning or alternative forms of energy), and then using these pieces of the President's thinking in science teaching and learning, resulted in more engaged students than traditional lessons. Similar responses were observed as science lessons incorporated hip-hop (e.g., rap lyrics or structures from hip-hop like cyphers). In the cases of both Obama and hip-hop related lessons, students spoke more often in class and raised their hands to answer questions more often. In addition, these lessons resulted in higher levels of emotional energy and student facilitation of discussions about science. For example, as students excitedly discussed the President's "swag" (i.e., way of dress, style, walking, or general comportment related to hip-hopness) when the Obama family was shown on video walking in the nation's capital, a conversation about the fact that the President was a Harvard graduate with "swag" led to a discussion of the President's naming of Harvard physicist John Holdren and marine biologist Jane Lubchenco to top science posts. One student mentioned, "It's like the hood, they just put each other on [give each other jobs] cuz they're both from Harvard …When I go there, I'll be in with that crew too, and me and Obama can talk about Jay-Z." A group of students took the conversation about the President's selection of John Holdren as an opportunity to research his credentials. Through this conversation, they also took a step towards a more substantive discussion related to science described below:

> Student A: Did you see the President walking down the street all swagged up? It was off the hook.
> Student B: He was walking like… I run this spot.
> Researcher: Yeah, I saw that. I wonder how he called up the science advisors and told them that they got the job. Probably just like that.
> Student B: He was probably like… "Yo, this is the President. Put whoever his name is on the phone right now."
> Student A: Who were the advisors he chose anyway?

> Researcher: I hear one of them is a physicist from Harvard.
> Student B (walking to the computer): I am going to look him up. I would want that job.
> Student C: Let me know what you find out.

The following exchanges illustrate that while traditional science class may provide opportunities for students to be in tune with current events in science, urban youth are more connected to science when hip-hopness is allowed into the classroom, particularly when hip-hopness is tied to the Obama Presidency.

> Researcher: So why is it that you're a lot more interested in science and in the class than you were before?
> Student A: First off, the class is a lot more interesting. We talk about science, but it's also about current stuff.
> Researcher: But we have talked about current issues before. We discussed global warming before. You didn't seem too involved back then.
> Student A: Well, the difference is that now it relates to us. I mean it's an issue that relates to everyone. But if Obama sees it as an issue, then it applies to us, too.
> Researcher: What do you mean by it applies to us? I mean who is the "us" you are referring to?
> Student B: "Us" is like the people. Not the rest of the people in the world, but like us in our own neighborhoods, our own community, and stuff.
> Student A: It's like the people who understand who we are, understand our music, our culture, our lives.
> Researcher: So Obama is a part of the us?
> Student A: He definitely gets us though. It's like he has a hip-hop vibe nah mean… So we can connect to him and then we can see what he's talking about… He has Jay-Z in his ipod.
> Student B: He connects to us and what we talk about in science so it [science] has more meaning now than before.

The discussion above highlights the potential of hip-hop inspired phenomena like the Obama effect in a field like science education. The use of hip-hop in science education is significant to the life experiences of urban youth, such that it stands as more than a means to temporary interest or peripheral engagement in science. Hip-hop based pedagogy moves beyond other forms of engagement like museum visits and site trips that create moments of engagement not supported by ties to students'

lifeworlds. Science teaching and learning is improved in the moments when students' motivation is enhanced by pedagogy that utilizes their hip-hopness as an integral part of instruction. In order to sustain their connection to science, it is necessary to explore youth culture and consistently utilize the information received from this exploration in the everyday delivery of instruction.

DISCUSSION

Although hip-hop culture has become prevalent among youth, especially among urban youth, society at large persistently devalues hip-hop culture. This devaluing of hip-hop culture has negative consequences on urban youth who have traditionally been marginalized in schooling broadly and science learning specifically. This article is motivated by the need to address how science educators can capitalize on hip-hop culture to connect urban youth to science, a school subject that is not typically associated with urban youth and that has historically excluded them. We argue that by acknowledging the deep impact of hip-hop on the lives of urban youth and by developing an appreciation and willingness to explore the potential of hip-hop culture in teaching and learning science, possibilities for success in science for these students are created. More specifically, novel tools for teaching science and developing youth interest in the discipline are created. For example, utilizing tools such as the Obama effect has a potential to penetrate urban youth culture and transform urban science education. Through the exploration of the connection between President Obama and hip-hop youth, the pedagogue finds new tools to transform practice, and the researcher finds new avenues to explore relevant research.

Like hip-hop, the significance of Obama's Presidency resides partly in the fact that he has added a new chapter to history. Both in the cases of hip-hop and Obama's Presidency, there is a certain historical significance implicit in being part of a phenomenon that becomes visible, even though it has existed and deeply impacted lives prior to its visibility. Unfortunately, for many who live in historically significant times and encounter people and ideas that represent a change in the status quo, the realization of the shifts that happen in existent structures are not explored until their time has passed.

Obama's presence as a Black man at the helm of the country allows urban youth of color who are part of hip-hop culture to see that there is a misrepresentation in the tomes of history that previously relegated people who looked like them to positions where they were not expected to be part of the best and brightest. For people of color across the globe,

Obama's election associates them with a form of excellence, power, and status that they previously did not perceive possible on such a large scale (Harlow, 2008). While this impact on people of color is significant, President Obama's presence as a participant in hip-hop stands as an opportunity to show that participation in hip-hop, which has been viewed in a grossly negative fashion by media and academia alike, can be a significant part of the identity of productive members of society. President Obama's hybridized identity, that encompasses his being a child from a single parent home, Ivy League school graduate, community organizer in urban settings, and participant in hip-hop, opens up the possibilities for hip-hop youth to feel validated in expressing their own hybridized identities that can be tailored to include science. With the acceptance of hip-hop culture into the urban science classroom, the bifurcation between being hip-hop and a good science student or scientist is shattered, and new possibilities for urban youth identities that surround science are formed.

The three theoretical constructs related to hip-hop in urban settings, discussed in this article, offer explanations for the Obama effect in the science classroom. According to the construct of social networks, as urban youth perceive that President Obama exhibits characteristics of hip-hop culture, they turn on to new networks that he may be tied to but that they are not yet a part of. In essence, President Obama's hip-hopness creates what Burt (2001) defines as a structural hole into existing networks, in this case dense hip-hop networks. When an event presents itself as a structural hole into an existing dense network, weak ties between two traditionally separate social networks support the creation of new forms of social capital, facilitate the growth of weak ties into strong ties, and opens up the possibility for new transformative networks. In this case, the election of President Obama stands as a structural hole in hip-hop youth's dense networks that allows for weak ties between urban hip-hop youth and the President to develop into strong ties to schooling broadly and science learning specifically.

Urban youth's perceptions of Obama's hip-hopness are also related to their understandings of the complexities of core and role identities. Since they consistently travel back and forth between a core hip-hop identity and a more superficial role identity in schools, they perceive the subtle exhibition of hip-hopness in speeches and during interviews by the President as an example of the same shifts between core and role identities that they undergo in their classrooms. Since hip-hop youth are forced to enact role identities because of the societal non-acceptance of their hip-hop culture, they believe that the President also undergoes this process. Therefore, they see past his role identity as President and

envision his hip-hopness as a part of his core identity when he is outside of the public eye. In a similar manner, they can envision themselves as having multiple identities that include one where being scientifically literate is a significant component. This view of self as a part of science without sacrificing their hip-hopness inevitably supports their success in the discipline.

Not sacrificing one's hip-hopness for the sake of school or academic success is part of the notion of realness that the Obama effect exemplifies. As hip-hop youth see Obama's hip-hopness as a genuine piece of his identity, they regard him as expressing a certain realness that they have an affinity for and develop an emotional connection to. Therefore, they generate these same types of connections to subject matter that is presented through a connection to a phenomenon that is rooted in hip-hop.

The examples of the Obama effect in urban high school science classrooms described in this article illustrate that science educators can strengthen hip-hop youth's connections to science by consistently using the science-related decisions the President is making as opportunities to teach science. Furthermore, by engaging in a concerted focus on hip-hop culture, science educators can connect urban youth to science in ways that generate a genuine recognition of who they are, an appreciation of their motivation for academic success, and an understanding of how to capitalize on hip-hop culture for their identities as science learners. Such efforts can eventually lead urban youth to become the best and brightest in the science classroom and pursue careers in science-related fields.

References

Aikenhead, G. S. (1996). Science education: Border crossing into the subculture of science. *Studies in Science Education, 27,* 1–52.

Anyon, J. (2009). Progressive social movements and educational equity. *Educational Policy, 23*(1), 194–215.

Barman, C. R. (1996). How do students really view science and scientists? *Science and Children, 34*(1), 30–33.

Bhattacharjee, Y. (2008). Democrat: Barack Obama. *Science, 319* (5859), 28–29.

Bourdieu, P. (1985). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). New York: Greenwood.

Brandwein, P. (1955). *The gifted student as future scientist: The high school student and his commitment to science.* New York: Harcourt.

Brown, B. A. (2004). Discursive identity: Assimilation into the culture of science and its implications for minority students. *Journal of Research in Science Teaching, 41*(8), 810–834.

Brown, B. A. (2006). "It isn't slang that can be said about this stuff": Language, identity, and appropriating science discourse. *Journal of Research in Science Teaching, 43*(1), 96–126.

Burke, P. J. (1991). Identity processes and social stress. *American Sociological Review. 56,* 836–849.

Burt, R. S. (1992). *Structural holes.* Cambridge, MA: Harvard University Press.

Burt, R. S. (2001). Structural holes versus network closure as social capital. In N. Lin, K. S. Cook, & R. S. Burt (Eds.), *Social capital: Theory and research* (pp. 31–56). New York: Aldine de Gruyter.

Buxton, C. (2005). Creating a culture of academic success in an urban science and math magnet high school. *Science Education, 89*(3), 392–417.

Calabrese Barton, A., & Yang, K. (2000). The culture of power and science education: Learning from Miguel. *Journal of Research in Science Education, 37,* 871–889.

Carstensen, L. L. (1992). Social and emotional patterns in adulthood: Support for socioemotional selectivity theory. *Psychology and Aging, 7,* 331–338.

Chang, J. (2005). *Can't stop, won't stop: A history of the hip hop generation.* New York: St. Martin's Press.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94,* 95–121.

Crowder, E. M. (1996). Gestures at work in sense-making science talk. *The Journal of the Learning Sciences, 5*, 173–208.

Dei, G. S., Mazzuca, J., McIsaac, E., & Campbell, R. (1995). *Drop-out or push-out? The dynamics of Black students' disengagement from school.* Toronto: University of Toronto Press.

Dillon, S. (2009, January 22). Study sees an Obama effect as lifting Black test-takers. *New York Times*, Web Only. http://www.nytimes.com/2009/01/23/education/23gap.html

Dimitriadis, G. (2001). *Performing identity/performing culture: Hip hop as text, pedagogy, and lived practice.* New York: Peter Lang.

Earl, J., Soule, S. A., McCarthy, J. D., (2003). Protest under fire? Explaining the policing of protest. *American Sociological Review 68,* 581–606.

Elmesky, R., & Tobin, K. (2005). Expanding our understandings of urban science education by expanding the roles of students as researchers. *Journal of Research in Science Teaching, 42,* 807–828.

Emdin. (2007). Exploring the contexts of urban science classrooms. *Cultural Studies of Science Education* (2) 2, 319–341

Emdin. (2009). Urban science classrooms and new possibilities: Intersubjectivity and grammar in the third space. *Cultural Studies of Science Education, 4*, 239–254.

Emdin, C. (2010a). Affiliation and Alienation: Hip-hop, rap, and Urban Science Education. *Journal for Curriculum Studies.*

Emdin, C. (2010b). Urban Science Education for the Hip-Hop Generation. Rotterdam; Sense Publishers.

Fenster, M. (1995). Understanding and incorporating rap: The articulation of alternative popular musical practices within dominant cultural practices and institutions. *Howard Journal of Communications, 5,* 223–244.

Flores, J. (2000). *From bomba to hip-hop: Puerto Rican culture and Latino identity.* New York: Columbia University Press.

Fordham, S. (1996). *Blacked out: Dilemmas of race, identity, and success at Capital High.* Chicago: University of Chicago Press.

Fordham, S., & Ogbu, J. (1986). Black students' school success: Coping with the "burden of acting White." *Urban Review, 18,* 176–206.

Forman, M., & Neal, M. A. (2004). *That's the joint! The hip-hop studies reader.* New York: Routledge.

Fort, D. C., & Varney, H. L. (1989). How students see scientists: Mostly male, mostly White, and mostly benevolent. *Science and Children, 26*(8), 8–13.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology – The broaden-and-build theory of positive emotions. *American Psychologist, 56*(3), 218–226.

Ginwright, S. (2004). *Black in school: Afrocentric reform, urban youth, and the promise of hip-hop culture.* New York: Teachers College Press.

González, N., Moll, L. C., & Amanti, C. (2005). *Funds of knowledge: Theorizing practices in households, communities, and classrooms.* Mahwah, NJ: L. Erlbaum Associates.

Guttierez, K., & Lee, C. (2009). Robust informal learning environments for youth from nondominant groups. In L. M. Morrow, R. R. Rueda, D. Lapp, E. W. Gordon, & E. J. Coope (Eds.), *Handbook of research on literacy and diversity* (pp. 216–232). New York: Guilford Press.

Hammond, L. (2001). Notes from California: An anthropological approach to urban science education for language minority families. *Journal of Research in Science Teaching, 38*(9), 983–999.

Harlow, R. (2008). Barack Obama and the (in)significance of his presidential campaign. *Journal of African-American Studies, 13*(2), 164–175.

Hertzberg, H. (2009, June 22). The Obama effect. *The New Yorker Online,* http://www.newyorker.com/talk/comment/2009/06/22/090622taco_talk_hertzberg [Accessed July 10, 2009]

Hill, M. L. (2009). *Beats, rhymes, and classroom life: Hip-hop pedagogy and the politics of identity.* New York: Teachers College Press.

Holmstrom, E. I., Gaddy, C.D., Van Horne, V. V., & Zimmerman, C. M. (1997, October). *Best and brightest: Education and career paths of top science and engineering students.* Washington, DC: Commission on Professionals in Science and Technology.

Homan, G. C. (1974). *Social behavior. Its elementary forms.* New York: Harcourt Brace Jovanovich.

Ibrahim, A. (1999). Becoming Black: Rap and hip-hop, race, gender, identity, and the politics of ESL learning. *TESOL Quarterly, 33,* 349–369.

Jimenez-Aleixandre, M. P., Rodriguez, A. B., & Duschl, R. A. (2000). “Doing the lesson” or “doing science”: Arguments in high school genetics. *Science Education, 84*(6), 757–792.

Jones, G. M., Howe, A., & Rua, M. J. (2000). Gender differences in students’ experiences, interests, and attitudes toward science and scientists. *Science Education, 84*(2), 180–192.

Keyes, C. L. (2002). *Rap music and street consciousness.* Urbana, IL: University of Illinois Press.

Kitwana, B. (2001). *The hip-hop generation: Young Blacks and the crisis in African-American culture.* New York: Basic Books.

Lee, O. (2003). Equity for culturally and linguistically diverse students in science education: A research agenda. *Teachers College Record, 105*(3), 465–489.

Lopez, R. E., & Schultz, T. (2001). Two revolutions in K-8 science education. *Physics Today,* September 2001. Retrieved 25 March 2010 from: http://www.aip.org/pt/vol-54/iss-9/p44.html

Masten, J. (2009), *“Ain’t no snitches ridin’wit’ us”: How deception in the Fourth Amendment triggered the stop snitching movement, Ohio State Literary Journal, 705,* 705–06

Moll, L. C. (1992). Bilingual classroom studies and community analysis: Some recent trends. *Educational Researcher, 21*(2), 20–24.

Morrell, E., & Duncan-Andrade, J. M. R. (2002). Promoting academic literacy with urban youth through engaging hip-hop culture. *English Journal, 91*(6), 88–92.

Mukherjee, A., Mukherjee, A., & Godard, B. (2006). Translating minoritized cultures: Issues of caste, class and gender. *Postcolonial Text, 2*(3) 1–23.

Obama, B. (2009a, April 7). *Remarks by the President at the National Academy of Sciences.* Washington, DC.

Obama, B. (2009b, February 24). *Speech to a joint session of Congress.* Washington, DC.

Rose, T. (2008). *The hip-hop wars: What we talk about when we talk about hip-hop and why it matters.* New York: Basic Books.

Schibeci, R. A. (1986). Images of science and scientists and science education. *Science Education, 70*(2), 139–149.

Seiler, G. (2001). Reversing the "standard" direction: Science emerging from the lives of African-American students. *Journal of Research in Science Teaching, 38,* 1000–1014.
Singham, M. (1998). The canary in the mine: The achievement gap between Black and White students. *Phi Delta Kappan, 80,* 9–12.
Stovall, D. (2006). We can relate: Hip-hop culture, critical pedagogy, and the secondary classroom. *Urban Education 41*(6), 585–602.
Skiba, R., Chung, C., Wu, T., Simmons, A., & St. John, E. (2000). *Minority overrepresentation in Indiana's special education programs: A status report.* Bloomington, IN: Indiana Educational Policy Center.
Skiba, R. J., Michael, R. S., Nardo, A. C., & Peterson, R. (2000). *The color of discipline: Sources of racial and gender disproportionality in school punishment* (Report #SRS1). Bloomington, IN: Indiana Education Policy Center.
Smitherman, G. (1986). *Talkin and testifyin: The language of Black America* (rev. ed.). Detroit, MI: Wayne State University Press.
Smitherman, G. (2000). *Talkin that talk: Language, culture, and education in African America.* New York: Routledge.
Turner, J. H. (2002). Face to face: Toward a sociological theory of interpersonal behavior. Stanford, CA: Stanford University Press.
Turner, J. H., & Stets, J. E. (2006). Sociological theories of human emotions. *Annual Review of Sociology, 32,* 25–52
Warren, B., Ballenger, C., Ogonowski, M., Rosebery, A., & Hudicourt-Barnes, J. (2001). Rethinking diversity in learning science: The logic of everyday language. *Journal of Research in Science Teaching, 38*(5), 529–552.
Zumeta, W., & Raveling, J. S. (2002, Winter). Attracting the best and brightest. *Issues in Science and Technology,* 36–40.

CHRISTOPHER EMDIN is an assistant professor in the Department of Mathematics, Science and Technology at Teachers College, Columbia University, where he also serves as Director of Secondary School Initiatives at the Urban Science Education Center. His research focuses on issues of race, class, and diversity in urban science classrooms, the use of new theoretical frameworks to transform urban education, and urban school reform. His recent publications include: "Affiliation and alienation: Hip-hop, rap and Urban Science Education" in the *Journal of Curriculum Studies* (2010); "Dimensions of Communication in Urban Science Education" in *Science Education* (2010); and his first book, *Urban Science Education for the Hip-hop Generation* with Sense Publishers (2010).

OKHEE LEE is a professor in the School of Education, University of Miami, Florida. Her research areas include science education, language and culture, and teacher education. Recent publications include: Lee, O. (2005). Science education and English language learners: Synthesis and research agenda. *Review of Educational Research, 75*(4), 491–530.