But is it really "***just***" science?: Engaging Critical Race Theory to Unpack Racial Oppression with Implications for Black Student Science Engagement

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Striving for Racial Justice in Academic Biology – SABER Seminar Series

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1. Who Am I?
   a. Educational Pedigree
      i. North Carolina A&T State University (B.S. Chemistry, 2011)
      ii. University of Miami (M.S. Neuroscience, 2013)
      iii. University of North Carolina at Chapel-Hill (Ph.D. Education, 2017)
   b. Identities
      i. Scientists, Advocate - Activist, Speaker, Civil Servant

2. Positionality
   a. Shaped by my identities, privileges exposures, commitments, and actions.
      i. Identities: Social identities (e.g., race, gender, religion) and socialization processes.
      ii. Privileges: Educational pedigree
      iii. Exposure: Experiences as a Black man, exposure to others, readings and conversations through graduate school and beyond.
      iv. Commitment: Goals related to racial justice, desire to enact transformative change,
      v. Action: Decision to research Black women in STEM, decision to conduct research that honors, empowers, and promulgates participants from asset-based perspectives.
   b. Reference texts:
      i. Harro, B. (2018). The cycle of socialization. In M. Adams, W.J. Blumenfeld, H.W. Hackman, X. Zuniga, & M.L. Peters (Eds.). *Readings for diversity and social justice* (4th p. 27-33). New York, NY: Routledge
      ii. Milner IV, H.R. (2007). Race, culture, and research positionality: Working through dangers seen, unseen, and unforeseen. *Educational Researcher, 36*(7), 388-400.
      iii. Noblit, G.W. (1993). Power and caring. *American Educational Research Journal, 30*(1), 23-38.
      iv. Ridgeway, M.L., & Yerrick, R.K. (2018). Whose banner are we waving? Exploring STEM partnerships for marginalized urban youth. *Cultural Studies of Science Education, 13*, 59-84.
      v. Tatum, B. D. (2018). The complexity of identity: "Who am I?". In M. Adams, W.J. Blumenfeld, H.W. Hackman, X. Zuniga, & M.L. Peters (Eds.). *Readings for diversity and social justice* (4th p. 7-9). New York, NY: Routledge

3. Defining Culture
   a. Two dominating perspectives

i. Anthropology & Sociology – Structures and processes defined by societies.
ii. Psychology – Individual perspectives and applications.

b. Reflected in Ideology (Science of Ides)
   i. Ontology (Reality), Epistemology (Knowledge), and Axiology (Ethics)
c. Reflected in Methodology (Processes to determine what is and what is not).
d. Reflected in Praxis (Accepted and implemented customs or practices).
e. Reference texts:
   i. Kivunja, C., & Kuyini, A.B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education, 6*(5), 26-41.
   ii. Parsons, E.C., & Carlone, H.B. (2013). Culture and science education in the 21st century: Extending and making the cultural box more inclusive. *Journal of Research in Science Teaching, 50*(1), 1-11.
   iii. Rogoff, B. (2003). *The cultural nature of human development*. New York: Oxford University Press

4. The Social-Political-Historical Culture of Science
   a. Ideology
      i. J. Blumenbach and "Scientific" racial classifications.
      ii. Thomas Jefferson and "Innate inferiority of Blacks."
      iii. S. Morton and skull sizes as evidence for racial stratification.
      iv. Social Darwinism and racism as "scientific and natural."
   b. Methodology
      i. Anarcha's torment – enslaved woman who J. Marion Simms used to perfect his technique. (Gynecology)
      ii. Eugenics Movement (Evolutionary Biology/ Genetics)
      iii. Tuskegee Syphilis Experiment (Epidemiology)
      iv. Henrietta Lacks stolen cells (Cancer Biology)
   c. Praxis
      i. Positivism – universal truth determined through experimental design.
         1. Objectivity, Individualism, Competition
   d. Reference texts:
      i. PBS Timeline on Race
      ii. Aikenhead, G. S. (1996). Science education: Border crossing into the subculture of science. Studies in Science Education, 27(1), 1–52. https://doi.org/10.1080/03057269608560077
      iii. Brown. B.A., & Mutegi, J.W. (2010). A paradigm of contradictions: Racism and science education. In P. Peterson, E. Barker, & B. McGraw (Eds.), *International Encyclopedia of Education* (Vol. 1, pp. 554-564). Oxford: Elsevier.
      iv. Cobern, W., & Aikenhead, G. (1998). Cultural aspects of learning science. In Fraser, B. J., & Tobin, K. G. (Eds.), The international handbook of science education (pp. 39–52). Great Britain: Kluwer Academic Publishers.
      v. Green, A. M. (2014). The systematic misuse of science. In Atwater, M. M., Russell, M., & Butler, M. B. (Eds.), Multicultural science education: Preparing teachers for equity and social justice (pp. 11–28). Netherlands: Springer.
      vi. Mutegi, J. W. (2013). "Life's first need is for us to be realistic" and other reasons for examining the sociocultural construction of race in the science performance of

African American students. *Journal of Research in Science Teaching*, *50*(1), 82-103.

5. Critical Race Theory
    a. Tenets
        i. Interest Convergence: white interest will only invest in Black progress when there is something for white interests to gain from the investment.
        ii. Racial Realism (Permeance of Racism): Racism is endemic, systemic, and integral to all U.S. social institutions.
        iii. Whiteness as Property: Legalized enslavement and extermination of the Indigenous created a system in which whiteness became commodified into physical property to possess and expend.
        iv. Critique of Liberalism: Belief in individualism and "bootstrap mentality" communicated through U.S. laws and social norms is false given systemic nature of racism.
        v. Intersectionality: Identities and experiences cannot be examined from single axes as individuals' identities are multiplicative and systems of oppression operate at intersectional axes.
        vi. Counter-Narrative/ Counter-Storytelling: The master narrative regarding the experiences of those minoritized is rooted in white supremacy and to determine the "truth" one must elevate, embrace, and empower the voices of those minoritized.
    b. Reference texts:
        i. Bell, D. (1980). Brown v. board of education and the interest-convergence dilemma. *Harvard Law Review, 93*(3), 518-533.
        ii. Bell, D. (1992). Racial realism. *Connecticut Law Review, 24*(2), 363–379.
        iii. Collins, P.H., & Blige, S. (2016). *Intersectionality.* Cambridge, UK: Polity Press.
        iv. Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Legal Review, 43*(6), 1241–1299.
        v. Crenshaw, K., Gotanda, N., Peller, G., & Thomas, K. (Eds.). (1995). *Critical race theory: The key writings that formed the movement*. New York, NY: The New Press.
        vi. Delgado, R. (1989). Storytelling for oppositionists and others: A plea for a narrative. *Michigan Law Review, 87*(8), 2411-2441.
        vii. Delgado, R. & Stefancic, J. (2017). *Critical race theory: An introduction* (3rd ed.). New York, NY: New York University Press.
        viii. Harris, C.L. (1993). Whiteness as property. *Harvard Law Review, 106*(8), 1707-1791.
        ix. Gotanda, N. (1991). A critique of "our constitution is color-blind". *Stanford Law Review, 44*(1), 1-68

6. CRT Perspective of Science Culture
    a. Racial Realism: ideology, methodology, and praxis of science centered around "objectively proving" white racial dominance.
    b. Interest Convergence: targeted DEI efforts to increase numerical racial diversity in STEM absent from transforming undergirding structures that require power redistribution.
    c. Whiteness as Property: standardization of practices under the perspectives of objectivity and color-blindness that privileges whiteness.

d. Intersectionality: failed attempts of existing DEI endeavors to redress oppression given the multiplicative nature of identity.
e. Counter-story: need for accurate "truths" about what is science through a lens that names systems of oppression while centering minoritized voices.
f. Reference texts:
    i. Bullock, E.C. (2017). Only STEM can save us? Examining race, place, and STEM education as property. *Educational Studies, 53*(6), 628-641.
    ii. King, N.S., & Pringle, R.M. (2019). Black girls speak STEM: Counterstories of informal and formal learning experiences. *Journal of Research in Science Teaching, 56*(5), 539-569.
    iii. Mensah, F.M., & Jackson, I. (2018). Whiteness as property in science teacher education. *Teachers College Record, 120*(1), 1-38.
    iv. Parsons, E. C. & Thompson Dorsey, D. (2015). The race problem: Its perpetuation in the next generation of science standards. In Drakeford, L. D. (Ed.), *The race controversy in American education* (Vol 2, pp. 215-237). Santa Barbara, CA: Praeger.
    v. Sheth, M.J. (2019). Grappling with racism as foundational practice of science teaching. *Science Education, 103*(1), 37-60.
    vi. Walls, L. (2016). Awakening a dialogue: A critical race theory analysis of U.S. nature of science research from 1967 to 2013. *Journal of Research in Science Teaching, 53*(10), 1546-1570.

7. Implications for Black Student Experiences
    a. Structural: systemic oppression
        i. Tokenism
        ii. Essentialism
        iii. Mirror-tocracy
    b. Sociocultural: racialized experiences
        i. Norms that maintain stereotypes, privileging and favoring assimilation and enculturation.
        ii. Beliefs that purport western, Eurocentric perspectives regarding "what is science and science practice."
        iii. Values that communicate need for resilience, grit, and tenacity.
        iv. Practices that foster alimentation and isolation.
    c. Psychological: Hypervisibility and invisibility
        i. Racial micro and macro-aggression.
        ii. Racialized metacognition.
        iii. Psychosocial well-being from constant resilience.
    d. Reference Texts:
        i. https://tinyurl.com/TRMPubs
            1. Morton, T.R. (2020). A Phenomenological and ecological perspective on the influence of undergraduate research experiences on Black women's persistence in STEM at an HBCU. *Journal of Diversity in Higher Education.* DOI: 10.1037/dhe0000183
            2. Morton, T.R., Gee, D.S., & Woodson, A.N. (2019). Being vs. becoming: Transcending STEM identity development through Afropessimism, moving

toward a Black x consciousness in STEM. *Journal of Negro Education, 88*(3), 327-342.

3. Morton, T.R, & Nkrumah, T. (In Press). A day of reckoning for the white academy: Reframing success for African American women in STEM. *Cultural Studies in Science Education*
4. Morton, T.R., & Parsons, E.C. (2018). #BlackGirlMagic: The identity conceptualization of Black women in undergraduate STEM education. *Science Education, 102*(6), 1363-1393. DOI: https://doi.org/10.1002/sce.21477
5. Ortiz, N.A., Morton, T.R., Miles, M.L., & Roby, R.S. (2019). What about us?: Exploring the challenges and sources of support influencing Black students' STEM identity development in postsecondary education. *The Journal of Negro Education, 88*(3), 311-326.

ii. McGee, E.O. (2020). *Black, Brown, bruised: How racialized STEM education stifles innovation.* Cambridge, MA: Harvard Education Press

iii. White, A. M., DeCuir-Gunby, J., & Kim, S. (2019). A mixed methods exploration of the relationship between racial identity, science identity, science self-efficacy, and science achievement of African American students at HBCUs. *Contemporary Educational Psychology, 57,* 54–71.

8. Take Dialogic Action!
   a. Embrace racial realism, examine your positionality, raise your critical consciousness, take dialogic action.
   b. Reference text
      i. Powell, C., Demetriou, C, Morton, T.R., & Ellis, J.M. (2020). A model for a CRT-informed model to enhance experiences and outcomes of racially minoritized students. *Journal of Student Affairs Research and Practice.*