Mathematics Learning and the Neoliberal Making of Undesirability

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Abstract: Neoliberal logics bring economic reason to all aspects of social life, including mathematics learning. Modeled after an anthropology of learning, this analysis explores the social processes and structural arrangements by which neoliberal logics rationalize a Latina high school mathematics student becoming "undesirable". Focusing principally on classroom-level processes, I argue the roots of undesirability were co-constructed by the curricular model, peers' perceptions, and family circumstances. Further, that the limbs of undesirability extended past the classroom to render her class of racially minoritized students undesirable within a *de facto* racially tracked math program; and, her school as undesirable for its predominantly racially minoritized student population. Using Positioning Theory in ways novel to the learning sciences, and in drawing on data collected over an academic year (fieldnotes, interviews, surveys), this analysis lays bare how undesirability is both a requirement of neoliberal mathematics learning *and* an emergent position for someone or something to occupy.

Introduction

This analysis concerns a 9th grade Latina student (Katia, pseudonym) in the lowest track of mathematics in a U.S. high school, who was experiencing a curricular model known to promote equity among diverse learners. Katia emerges as a telling case because she stands apart within an otherwise successful story: all of the students, including those who failed Algebra twice and thrice before, passed the course. This analysis explores learning as a process of becoming (Lave & Wenger, 1991; Wolcott, 1982) and models its interpretations after an anthropology of learning, by moving from the immediate scene of activity to broader discourses and histories imbued in talk, activity, and cultural artifacts (e.g., Erickson, 2004). As such, the analysis focuses principally on the classroom-level processes, or roots of Katia's undesirability, which were co-constructed through family circumstances, the curricular model, and peers' perceptions of her. The limbs of undesirability, however, extended up to her math class as undesirable in a *de facto* racially tracked program, and her school as undesirable for its high numbers of racially minoritized students. This trace across scales shows how neoliberal mathematics education requires undesirability of someone or something *and* that undesirability is an emergent position created in the discursive, interactional, and material forms that circulate in Katia's social worlds of classroom, school, and community.

Neoliberal logics and deficit discourses of race and class

The legacy of deficit discourses in education is that they compel stratification; they create 'smart' or 'dumb', 'success' or 'failure', 'desirable' or 'undesirable'. Reckoning with the success-failure system of schooling means recognizing that stratifying paradigms are neither natural nor inevitable – the "cultural fact" of success and failure in learning is connected to the political economy and is detailed in everyday behavior (Varenne & McDermott, 1998, xiii). The "cultural fact" of this analysis are the neoliberal logics that spread through Katia, her class, and school, to normalize stratification. Neoliberalism, Brown (2015) explains, is a "distinctive mode of reason" by which "both persons and states are expected to comport themselves in ways that maximize their capital value in the present and enhance their future value" (pp. 21-22). Neoliberal discourses frame mathematics learning, for example, as an investment in skills and knowledge, and the learner as human capital valued for her productivity in the marketplace. Neoliberalism, understood as racial capitalism, can undo initiatives of racial integration or equality because incorporation of the racially minoritized or female subject is "often intrinsically and structurally impossible" (Melamed, 2011, p. 47). Consider, for example, mathematics curricular models organized to promote equity but constrained by racial tracking. Or, attempts to destabilize racialized notions of smartness (Hatt, 2016) in mathematics, only to find structures reasserting learning as speed, efficiency, and achievement. Indeed, neoliberal logics usher in a value system where incorporating the "cultural Other" is all but impossible but for the lowest strata, or position, made available to her.

Positioning theory

Positioning Theory features prominently in studies of mathematics learning and is particularly useful in thinking about undesirability as an emergent position across Katia's social worlds. Positioning Theory looks to the interactional and discursive moves of individuals (*positioning*) in relation to broader discourses (*storylines*) in the study of identity (Davies & Harré, 1999). Positioning is a dynamic construct used to understand, for example, how a student becomes seen as "bossy" (Langer-Osuna, 2011) or the "dumb one" (Bishop, 2012). Positioning

theory thus affords a conceptual and interpretive move between analytic planes, as depicted in Figure 1 (left), which is the dominant approach taken in studies of mathematics learning and identity (e.g., Bishop, 2012; Langer-Osuna, 2011). In Figure 1 (left) the upper plane represents discursively invoked deficit discourses that enforce and are enforced by the lower plane of microgenetic activity (e.g., four students collaborating).

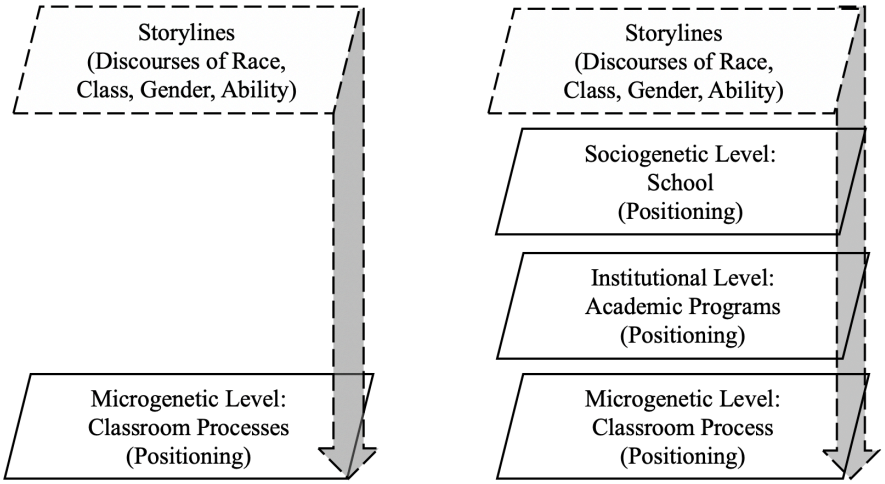

Figure 1. Dominant use of Positioning Theory (left); and as used in this analysis (right).

This analysis brings a similar import to microgenetic processes but extends to coordinate multiple social worlds. Figure 1 (right) depicts this novel use of Positioning Theory as four planes: the microgenetic level of classroom activity positioning individuals; the institutional level positioning collectives (a racial group, a class); the sociogenetic level positioning the institution; and finally, deficit discourses enforcing and enforced by the sociogenetic, institutional, *and* microgenetic planes.

Methods

Setting and participants

Redbird High School (RHS) was a suburban school in a community that gained prominence with Internet start-up firms in the 1990s. In the year of study, it was the most racially and socioeconomically diverse district school. Table 1 shows district high school demography and the Academic Performance Index (API) of each.

Table 1: Demography of district high schools in percentages

School (API score)	White	Asian	Philipx	Latinx	African American
Redbird HS (706)	30	16	14	35	4
Area HS 1 (810)	38	49	1	9	2
Area HS 2 (842)	51	33	2	11	3
Area HS 3 (901)	24	72	1	2	1
Area HS 4 (916)	30	67	< 1	2	< 1

The focal mathematics class was Yearlong Algebra (YA1), the lowest track of math. The teacher was a white woman with eight years of teaching experience. She used a curricular model known as Complex Instruction, which is known for coordinating task design, participation structures, and teacher actions to promote academic and social equity in diverse learning communities (Cohen & Lotan, 2014). The students were all racially

minoritized (n=16), majority female and Latinx. Katia was a 9th grade, Mexican-American student who lived with her father and stepmother but was expelled from their home midyear. Katia was the only student to fail: she earned a B in first semester and an F at year's end. A veteran (>35 years) administrator overseeing social programming and an early career (< 7 years) administrator overseeing the math department were interviewed for the study.

Data collection

These data were collected over an academic year in an ethnographic study of collaborative mathematics learning. This analysis focuses on two cycles of observing Katia – four days in first semester and ten days in second semester. Fieldnotes captured group and teacher interactions, and whole-class discussions. Semi-structured interviews were employed three times over the year, with the last interview organized as a paired discussion. The interviews solicited students' perceptions of self, CI as a curricular model, and peers. Sociometric network surveys were administered in the second interview to construct a model of the classroom community asking, for example, who students preferred to collaborate with (or not) and why (Wasserman & Faust, 1994). Semi-structured interviews were conducted with the teacher and two school administrators for their perspectives on the classroom, and the mathematics program and school, respectively.

Data analysis

Analyses were organized around the plane depicted in Figure 1 (right). For the microgenetic level, analytic memos on Katia's positioning were written in relation to chronological content analyses of fieldnotes. The sense of Katia's worsening academic and social position led to emotion coding (Hubeman, Miles & Sadaña, 2014) to characterize the affective tone of her peer and teacher interactions. Sociometric network surveys were used to develop two models: a) nominations students received as desirable/undesirable collaborators; and b) mutuality of nomination to indicate strength of the relational tie. At the institutional level, the teacher and math administrator interviews were chunked by topic, then chunks were collated, and finally analytic memos captured interpretations of where discourse of race, class, or ability surfaced. Numeric data on track placement by race (provided to me during the administrator interview) was analyzed using Pearson's chi-square analysis to determine statistically significant outcomes. Finally, the veteran administrator interview, school website, and media (national newspaper) accounts were used to identify discourses of race and class at the institutional and sociogenetic levels.

Findings

Sociogenetic: School within district

RHS represented many of the racial and economic dynamics that constitute the geopolitical divide between "urban" and "suburban" schooling. Fifty percent of students were designated for Title I funding, an indicator of low socioeconomic status. A similarly sized high school, in contrast, reported only 2% of students as Title I eligible. RHS was also set apart as the lowest performing and most "Black and Brown," a rhetorical association indexing it as an academic and social liability. As the veteran administrator explained, "We have lots of kids of color…And whether racist consciously or subconsciously, [residents] think it must be a school with some problems [so]… when it's time for their child to come, they don't" (Interview, September 28). In fact, the *Wall Street Journal* published interviews with local white families the year prior, who were leaving in response to a rise in Asian immigrants who they saw as increasing the competitiveness of schools. The discourse of excessively competitive Asians overtaking schools as white institutional space represented a different but related set of racial dynamics where, for the administrator, white residents were similarly avoiding the nonwhite, non-Asian students at RHS. Thus, neoliberal logics of race and class resourced a positioning of RHS as undesirable in the community.

Institutional: Lowest track mathematics within school

At the institutional level, processes and artifacts associated with tracking were imbued with neoliberal logics and (whispered) discourses of race and ability. For example, the math administrator suspected track placement by teachers was discriminatory: "Well, if it was a [*whispers*] Latino family or a Latino last name [*stops whispering*] then probably YA1" (Interview, September 12). While she hoped her suspicions would be proven untrue with "statistical understanding," they were not. A Pearson's chi-square (χ^2) analysis showed statistically significant racial disparities by track [χ^2 (48) = 330.8464, r = 0.000]: Latinx students were disproportionately assigned to lower tracks for all but one math course. Additionally, there were guidelines for feeder middle school teachers on track placement. As a cultural, discursive and material artifact mediating the institutional need for a tracked student, and the emergent positioning of a student to track, the guidelines said YA1 students likely had lower

scores and needed more skills support and time than others. The emphasis on skills, scores, and speed messaged the hallmarks of neoliberal mathematics learning.

Microgenetic: Katia within the classroom community

At the microgenetic level, Katia's undesirability was co-constructed by the curricular model, her increasingly precarious family living circumstances, and peer perceptions of her as a collaborator. There was a statistically significant decline in Katia's positive coded teacher interactions [χ^2 (1) = 20.6355, p< .01] and positive peer interactions [χ^2 (1) = 14.4827, p< .01] – see Table 2.

Table 2: Percentage distribution of emotion coding of fieldnote excerpts

	Semester 1 (Positive)	**Semester 2 (Positive)**	**Semester 1 (Negative)**	**Semester 2 (Negative)**
With Teacher	43	14 (↓)	57	86 (↑)
With Peers	44	19 (↓)	56	81 (↑)

Fieldnote analyses further showed how the curricular model required vulnerability from students to engender teacher support. This worked against Katia and her growing sense of vulnerability at home. The peer consequences of this mismatch surfaced in sociometric models, wherein Katia was uniquely set apart. By second semester, Katia's peers had only nominated her as undesirable (Figure 2, left); and, Katia had the strongest mutual ties of undesirability within the community (Figure 2, right).

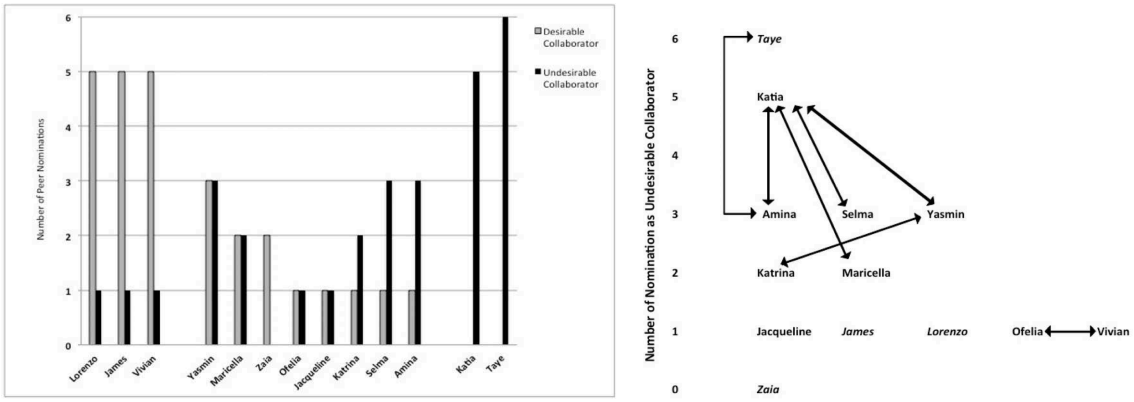

Figure 2. Model of desirable/undesirable peer nominations (left); Model of mutual undesirability (right).

Interview analyses of how students explained their nominations (not presented here) showed that they conflated affability with desirability, as the curricular model invites, which was consequential for Katia as her circumstances deteriorated from first to second semester. And, while no curricular model could have solved Katia's housing instability it is not naïve to think she could have found her place over time instead of becoming positioning as undesirable within the broader undesirability of Latinx students in the tracked math program.

Discussion

Figure 3 summarizes this case of undesirability as a multi-level requirement of neoliberal logics, and an emergent position that Katia, her class, and the school come to occupy. This "science of people" (McDermott, 1993) repudiates individual paradigms of success/failure, desirable/undesirable as cultural facts, to instead spotlight logics that bind children to a political economy of race and class; to spotlight the processes and arrangements of "educability", "desirability", or "smartness" that normalize stratification.

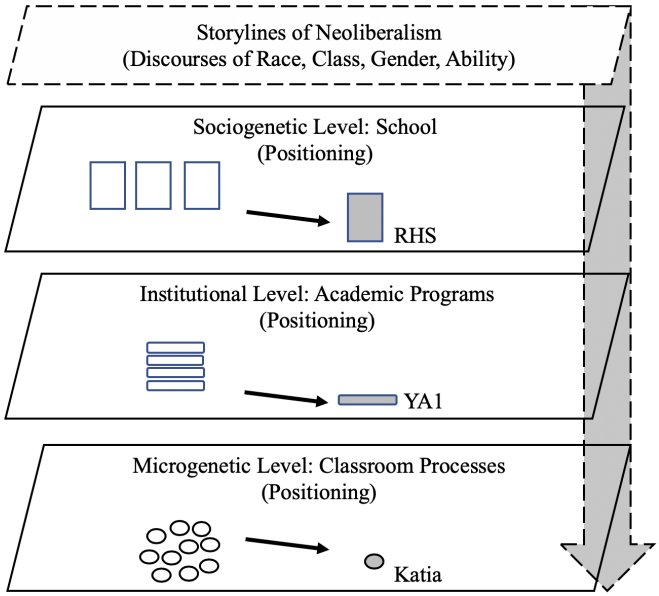

Figure 3. The emergent position of undesirability at microgenetic, institutional, and sociogenetic levels.

McDermott (1993) argued that a science of people requires new methods and language for describing children, learning, and schools. The methods used in this analysis are not new but rather, newly arranged, as an ensemble of observations, interviews, sociometric modeling, and quantitative analyses consistent with an anthropology of learning (Wolcott, 1982). Further, the language of mathematics learning and becoming undesirable offers a perspective different than success/failure. Success/failure is teleological and easily aligns with neoliberal logics. Desirability suggests something more than assessment for a known outcome: it carries a sense of wanting, affinity, and belonging on one hand, and a sense of unwantedness, loathing, and rejection on the other. It humanizes the inhumane experiences of social inequality and subjugation experienced by children like Katia as something both measurable but also, something *felt* – viscerally and emotionally – in relation to people around them every day.

References

Bishop, J.P. (2012). She's always been the smart one. I've always been the dumb one: Identities in the mathematics classroom. *Journal for Research in Mathematics Education, 43*(1), 34-74.

Brown, W. (2015). *Undoing the demos: Neoliberalism's steal revolution.* Cambridge, MA: MIT Press.

Cohen, E.G. & Lotan, R.A. (2014). *Designing groupwork: Strategies for the heterogenous classroom.* New York, NY: Teachers College Press.

Davies, B. & Harré, R. (1999). Positioning and personhood. *Positioning theory: Moral contexts of intentional action*, 32-52.

Erickson, F. (2004). *Talk and social theory*. Cambridge: Polity Press.

Hatt, Beth. 2016. "Racializing Smartness." *Race Ethnicity and Education. 19*(6): 1141–1148

Huberman, A.M., Miles, M. & Sandaña, J. (2014). *Qualitative data analysis: A methods sourcebook*. Sage Publications.

Langer-Osuna, J.M. (2011). How Brianna became bossy and Kofi came out smart: Understanding the trajectories of identity and engagement for two group leaders in a project-based mathematics classroom. *Canadian Journal of Science, Mathematics and Technology Education, 11*(3), 207-225.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university Press.

McDermott, R. (1993). The acquisition of a child by a learning disability. In S. Chailklin & J. Lave (Eds). *Understanding practice: Perspectives on activity and context*, 269-305.

Melamed, J. (2011). *Represent and destroy: Rationalizing violence in the new racial capitalism.* Minneapolis, MN: University of Minnesota Press.

Varenne, H. & McDermott, R. (1998). *Successful failure.* Boulder, CO: Westview Press.

Wolcott, H.F. (1982). The anthropology of learning. *Anthropology & Education Quarterly, 13*(2), 83-108.