

# THE NON-MATHEMATICAL ASPECTS OF MATHEMATICAL PROBLEM SOLVING IN URBAN CLASSROOMS

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**Introduction:** “Being hard like a “gangsta” is viewed by several youths...as inextricably linked to being Black or Latino, male, low-income, and from a tough urban neighborhood.” (Dance, 2002 pps. 4-5). Closely related, Anderson (2000) notes that certain types of behaviors, or “codes” often govern the actions of the youngsters-both in and out of school. “At the heart of the code is the issue of respect – loosely defined as ... being granted one’s ‘props’ (or proper due) or the deference one deserves,” (see Anderson, 2000). These “codes” include mannerisms, gestures, and facial expressions indicative of street cultures (Dance, 2002). The main question that address is: when and how do students’ enact, through gesture or argument, these types of street “codes” in the context of solving mathematical problems. This research is part of a larger study that seeks to identify how certain aspects of the urban environment influence the mathematical problem solving behavior of children, (see Epstein, et.al. in press).

**Methods:** The study takes place over a one-month period, which involved one visit a week (60 minute session) in a diverse, low performing, eighth grade inner-city classroom. The visits are part of a professional development project in which the classroom teacher & district teacher leader participated in professional development sessions with researchers, both at the University and within the context of their own classrooms. At least two video cameras captured different views of the teacher interventions, students’ group work, students’ presentations, etc. All student work was collected and descriptive field notes were compiled by at least two researchers. After each lesson, the participants would “debrief” to discuss key ideas relating to affective issues, mathematical ideas, and other relevant issues.

**Preliminary Results:** Below, for brevity sake, we report on one episode in which the students were given a task involving maximizing area, given a fixed perimeter. They were asked to work in groups, and then share ideas at the overhead projector. Several students argued about the meaning of area and perimeter. The mathematical discussions that arose from these varied perspectives were at times heated, and appeared to be confrontational in nature. The following is one such example:

[J]: Calm down! [T]: It didn’t say the area! [J]: I know .... You just said .... Remember you just said .... I know .... (Clapping hands) [T]: But you just said .... You just said it’s not the area (gestures with hands and looks at E). [E]: We’re looking for the area (hits hands together). [Teacher]: Okay class! Let’s be civilized. [E]: I say 64 is not the area .... [N]: We is (sic) civilized. We is (sic) having a debate with numbers. [E]: 64 is not the area!!

Throughout the exchange, the students appeared to use hand gestures and facial expressions that emphasized their commitment to an idea. The teacher’s comments indicate that she felt that they were acting “uncivilized”. These behaviors, while benign in nature in the context of this lesson, could easily be misconstrued by an outside observer, or a teacher, unfamiliar with as Anderson describes, ‘the code of the street’. We speculate that by better understanding such behaviors, we may gain deeper insight into how to create and maintain a productive classroom culture.

## References:

- Anderson, E. (1999). *Code of the Street*. New York: W. W. Norton & Company.
- Dance, L. J. (2002). *Tough Fronts: The Impact of Street Culture on Schooling*. New York: Routledge-Falmer.
- Epstein, Y., Schorr, R. Y., Goldin, G. A., Warner, L., Arias, C., Sanchez, L., Dunn, M., & Cain, T (2007, in press). Studying the affective dimension of an inner-city mathematics class. To be published electronically in the *Proceedings of the 29<sup>th</sup> Annual Conference of PME-NA*.