

Innovating motivation research: Insights from urban middle school classrooms on the links between psychosocial classroom activity and mathematics learning

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Over the past 40 years much progress has been made in understanding how student cognition and motivation affect learning and achievement outcomes (e.g., Blackwell, Trzesniewski, Dweck, 2007; Dunlosky, Rawson, Marsh, Nathan, Willingham, 2013). However, the vast majority of this work has focused on the cognitive and motivational factors that occur at the level of the **individual student**, which misses the on-going social processes that may play a large role in driving both student level motivation and achievement outcomes (McCaslin, 2009). Little work has focused on measuring motivational constructs that are co-constructed through interactions in the **classroom** or what situative theorists have called the **activity system** (Greeno, 2006). We argue that understanding motivation within an activity setting framework (i.e., classroom level) is critical because many of the motivationally-relevant instructional events that happen in a classroom occur as publicly viewed student-teacher interactions and not within simplistic dyadic structures. Furthermore, most prior work has progressed as two separate strands, one focused on cognition and the other on motivation, with much less work investigating how these two constructs relate to and interact with one another to support learning.

To begin to address these gaps in the literature we developed a research program to a) identify cognitive, metacognitive, competence, autonomy, social, and emotional support factors at the classroom level, and b) examine how various configurations of these factors (i.e., psychosocial support profiles) relate to student learning and achievement. To do this we examined the talk patterns and learning outcomes of 40 middle school math classrooms from the Measures of Effective Teacher data base. We selected 20 classrooms that had high value-added scores on the Balanced Assessment of Mathematics (a conceptual math assessment) and 20 classrooms that had low value-added scores on that assessment, controlling for video topic and instructional quality. In phase one of the work we transcribed the teacher and student talk of the 40 videos. We then assembled six sub-teams of researchers to develop coding rubrics for different forms of cognitive and motivational support (or lack thereof) including: analogy, retrieval practice, metacognition, equity, autonomy, and achievement goals. Then each group applied their coding rubric to the same set of 40 transcripts and videos. Most of the rubrics focused on teacher talk and actions. This analysis led to a number of interesting results on the amount and type of various kinds of support across high and low growth classrooms. A subset of this work and results were presented at a symposium "*Investigating Cognition and*

¹ This project has generously supported the work of a large team of graduate students and faculty including: Kelly Boden (Pitt, Cognitive Psych), Lisa Fazio (faculty as Vanderbilt), Nabila Jamal-Orozco (Pitt, HMB, Cognitive Psych), Liz Richey (faculty now at Miami University), Hannah Sung (Pitt, Applied Development Psychology), Jasmine Williams (Pitt, Applied Developmental Psychology), Cristina Zepeda (Pitt, Cognitive Psych). It has also supported the training of a large team (9) of undergraduate research assistants.

Motivation at the Classroom Level” for Division C - Section 2b: Learning and Motivation in Social and Cultural Contexts at the American Education Research Association (AERA). We currently have 4 journal papers in preparation based on this work. Through this work we have created a theoretical framework for analyzing an array of cognitive and motivational constructs in classroom talk and produced a rich data set that we can continue to elaborate. For example, we have recently extended the analysis to examine the role of emotional support as well.

In the second phase of the work we examined each video and transcript from an interactive perspective and have been conducting a qualitative analysis on a subset of the data. This work will continue through the next year and will result in a journal paper submission based on this analysis with an aim to bridge several strands of the phase 1 work. We will also continue work on the psychosocial classroom profiles with a systematic, quantitative analysis of relations of the amount and types of support across each of the already coded constructs from phase 1. This project has supported both theoretical and methodological innovation and will further support new grant proposals to refine the theoretical framework and begin to test interventions based on the observed relations from the current data.

Conference Presentations:

Boden, K. K., & Nokes-Malach, T. J. (2016, April). Examining classroom support of achievement goals through talk. In T. Wallace (Chair), *Investigating cognition and motivation at the classroom level*. Symposium conducted at the annual meeting of the American Educational Research Association, Washington, DC.

Fazio, L. K. (2016, April). Teacher questioning: Opportunities for retrieval practice in middle-school math classrooms. In T. Wallace (Chair), *Investigating cognition and motivation at the classroom level*. Symposium conducted at the annual meeting of the American Educational Research Association, Washington, DC.

Richey, J. E., Walker, T., Green, C., & Nokes-Malach, T. J. (2016, April). Relational mapping: An interactive perspective on classroom-level analogy support. In T. Wallace (Chair), *Investigating cognition and motivation at the classroom level*. Symposium conducted at the annual meeting of the American Educational Research Association, Washington, DC.

Williams, J. D., Francis, M., Sung, H. C., & Wallace, T. L. (2016, April). Teaching for equity: How classroom interactions influence achievement. In T. Wallace (Chair), *Investigating cognition and motivation at the classroom level*. Symposium conducted at the annual meeting of the American Educational Research Association, Washington, DC.

Zepeda, C. D., Hlutkowsky, C. O., Partika, A. C., & Nokes-Malach T. J. (2016, April). Identifying teachers’ supports of metacognition in the classroom. In T. Wallace (Chair), *Investigating cognition and motivation at the classroom level*. Symposium conducted at the annual meeting of the American Educational Research Association, Washington, DC.