

USING TRANSCRIPT ANALYSIS TO PREDICT STUDENTS' SELF-REPORTED HAPPINESS IN ELEMENTARY MATHEMATICS CLASSROOMS: METHODOLOGICAL CONSIDERATIONS

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In this study, we tested the extent to which researchers with classroom experience can predict students' happiness and engagement in elementary math classes. The research group analyzed lesson transcripts and hypothesized which classrooms students rated as high-engagement/high-happiness. We sorted the teachers into high or low groups with 50% accuracy. We suggest four possible explanations for the group's inability to accurately guess: (1) students and adults have different views of which classroom practices will generate student happiness, (2) failure to consult literature on the conceptualization of happiness in elementary aged children, (3) existence of a halo effect and (4) contextualized relationships in classroom environments matter. To conclude, we suggest methodological improvements to increase the probability of identifying high engagement practices in elementary math classrooms via transcript analysis.

Keywords: affect, emotion, beliefs, and attitudes; elementary school education; policy matters

Introduction

Students' experiences in the classroom matter. We see two components of the student experience as especially important: levels of academic achievement and happiness. Drawing on the conceptual framework of Talebzadeh & Samkan (2011), student happiness is associated with several factors related to school performance of both students and teachers. Psychologists note that student happiness affects the school environment and can increase students' performance on measures of academic achievement as well as socio-emotional growth; outcomes often touted as key goals of education (Suldo, 2016). Additionally, there is a relationship between student happiness, teacher happiness, and learning (Blazar & Kraft, 2017). These three factors interact in different ways depending on the student's level of happiness. In general, happy students perform better academically and socially (Parrish & Parrish, 2005; Quinn & Duckworth, 2007). Although Parrish and Parrish (2005) did not look at measures of student achievement specifically, they did find that as students' happiness increases, students also increase in collaborative learning, respect, and enjoyment of school. Quinn & Duckworth (2007) found that students ages 10-12 who had higher levels of subjective well-being "went on to earn significantly higher final grades after controlling for IQ" (p. 3). Additionally, Quinn & Duckworth (2007) noted that students with higher levels of subjective well-being were more successful than their peers at raising their level of academic achievement. More broadly, researchers of happiness note that happiness is often linked with personal well-being (e.g., Graham, Powell, Thomas & Anderson, 2017; Price, Allen, Ukoumunne, Hayes & Ford, 2017). Because elementary school students spend upwards of a fourth of their day at school, understanding how students conceptualize happiness in the classroom is important for their overall well-being (Graham, Powell, Thomas & Anderson, 2017). If researchers have the ability to identify high happiness classrooms using transcripts, there may be opportunities for school-level actors to provide specific pedagogical support to increase students' self-reported measures of happiness in their

elementary math class. Furthermore, understanding which instructional components predict student happiness will support future efforts to validly measure and improve student happiness at the classroom level. Given the importance of student happiness in the classroom, this paper investigates the ability of a research team to identify elementary math classrooms where students rated their experience as high engagement/high happiness versus classrooms where students rated their experience as low engagement/low happiness. Using survey data at the student level, transcript review, and video observations, this is the first study of U.S. public schools that provides guidance regarding the methods researchers should use to gauge students' happiness and engagement in elementary math classrooms. In the subsequent sections, we explain our original investigation to predict students' level of engagement/happiness using three lesson transcripts, why our findings aligned with previous research regarding the use of transcripts to predict a student's class perception, and we provide suggestions to improve the use of transcripts to predict students' conceptualizations of happiness in the elementary math classroom.

Investigation & Methods

We began with a group of twelve elementary math teachers, all of whom participated in a larger study that randomly assigned fourth and fifth-grade teachers to student rosters in four East Coast school districts in the United States (Blazar, 2015). This subset of teachers was selected based on high value-added scores, which allowed the investigation to focus on students' engagement/happiness while holding increases in students' academic achievement levels on standardized tests constant. Before beginning the project, researchers learned that six of the teachers received high ratings for engagement/happiness and six teachers received low ratings for engagement/happiness. Engagement/happiness ratings came from a student survey.

For each teacher, the research group reviewed three lesson transcripts and three video recordings of the class over one academic year. Due to IRB restrictions, two senior research group members had access to video recordings and transcripts of each class. The other four members of the research group only had access to the transcripts of each class. Each week researchers were randomly assigned two of a particular teacher's three videos or transcripts to review. Researchers met in person each week to discuss features of lessons that would align with their perceptions of high engagement/happiness or low engagement happiness. Given the thin literature base regarding the identification of student engagement/happiness via transcript and video review, the group used an open coding system. Prior to the weekly meeting, researchers worked independently to identify the most salient features of a teacher's practice that would align with students' conceptualization of their elementary math classroom as either a high engagement/happiness space or a low engagement/happiness space. At the end of each meeting, one researcher wrote a memo regarding the prominent features of the teacher's practice that the researchers hypothesized would increase or decrease students' engagement/happiness in math class. The research team also offered a guess about the engagement/happiness level of students in the class. The research group discussed their guesses until arriving at a consensus. The guesses were recorded in a spreadsheet.

At the conclusion of the coding and guessing process for all twelve teachers, the faculty advisor shared with researchers the survey results from each teacher's students. The research group was not successful at guessing whether students would rate a particular teacher as either high engagement/high happiness or low engagement/low happiness. In the end, only 50% of the predictions aligned with student perceptions of engagement and happiness in the math classroom (Table 1).

Table 1: Research Team Guess Spreadsheet

Teacher Identification Number	Happiness/Engagement Score via Student Survey	Researcher Guesses
12002	High	Low
12006	Low	Low
12008	Low	Low
12020	Low	High
13102	High	Low
14019	Low	Low
14030	High	High
14040	High	Low
14060	Low	High
14117	High	High
14127	Low	High
11070	High	High

The transcripts and the video did not provide the research team with the level of context required to accurately assess the dynamics in the classroom that would align with a student's perception of happiness/engagement in their elementary math class (Miles & Huberman, 1994; McCormack, 2000). As predicted by other studies that relied on transcript review, with limited context the research team was unable to accurately guess students' level of engagement/happiness.

Identification of Methodological Issues

After reviewing the original investigation, we propose four methodological issues that decreased the probability that the research group could correctly identify whether students rated the classroom as high or low engagement/happiness: (1) students and adults have different views of which classroom practices will generate student happiness, (2) failure to consult literature on the conceptualization of happiness in elementary aged children, (3) existence of a halo effect and (4) contextualized relationships in classroom environments matter.

Differing Conceptualizations of Happiness Related Classroom Practice

The literature on student happiness indicates that students and teachers may approach features of a happiness and engagement from different perspectives, which may indicate why a group of researchers were unable to view the transcripts from the student perspective. In a mixed-methods study, Tenny (2011) found that while the themes that emerged in her literature review also emerged in her findings, additional themes emerged that were not present in the literature. Based on the review of the literature, Tenny (2011) expected the following to impact student happiness: appropriate level of challenge, level of academic support, engagement and enjoyment through hands on meaningful, and collaborative activities, and positive relationships. Students also stated that physical and mental breaks, frequency of testing and homework were also important factors in their happiness. While researchers are capturing salient features of what contributes to classroom happiness for students, their adult objectivity can serve as a hindrance to them being able to identify components of classroom instruction that are important to young children. Holder and Coleman (2008) state that happiness in children may be different than that of adults because children lack the cognitive maturity and life experiences that influence the happiness of adults. In their study of how

well-being is conceptualized and practiced in schools, Graham et al. (2017) found that teachers and students differed in their responses. In addition, the student-reported teacher actions that contributed to well-being were divergent among elementary- and secondary-aged students (Graham et al., 2017).

Failure to Consult Literature on Elementary Student's Conceptualization of Happiness

The research team did not consult the literature on student engagement/happiness in elementary school classes. Instead, the team reviewed the literature for studies that specifically focused on elementary school math classrooms and student engagement and happiness; finding none, the team decided to conduct the qualitative analysis using an open coding system. In retrospect, the literature on the elementary student engagement/happiness broadly could have provided the initial investigation with a stronger approach. Without a framework, the group brought their personal experiences and conceptualizations of student happiness to the transcript review process. Examining the classroom memos, the researchers lacked a clear definition regarding what features of a classroom would be indicators of a student's perception of a specific classroom as high engagement/happiness versus low engagement/happiness (Merriam, 1998).

Possibility of Halo Effect

The halo effect could have significantly biased our results. Students who score higher on standardized tests might be more likely to rate their teachers and classrooms higher in engagement/happiness (Egalite & Kisida, 2018). While we knew all the teachers in the study had substantial improvements in how their students performed on standardized testing, we were not privy to students' academic success. Without knowing the students' baseline math scores, it was unclear if students made substantial gains in the year of the study or if students had experienced greater gains in the years previous to joining the classroom of study. As a result, it may be that teachers rated as high engagement were rated so because of students' experiences and growth in math classes the year before and had limited relationship with the current teacher's actual day-to-day practices.

Relationships Matter (students-to-student & teacher-to-student)

The literature on student happiness indicates that relationships in the school are important to the way students conceptualize happiness. During our initial investigation, the research group used data that did not capture the relationships in the classroom. As a result, the group could not determine the peer-to-peer effects in a specific classroom nor could the group accurately gauge the level of connectivity between teachers and students. Our use of transcripts and videos without interacting with teachers and students provided insufficient data regarding the level of relationships in the classroom; thus the relationship between student connectivity to their peers or teacher was missing (Miles & Huberman, 1994; McCormack, 2000). To be clear, we are not saying that teachers are unimportant; rather, the relationship among teachers and students underscores the academic and social processes in the classroom, and more emphasis should be placed on these relationships when understanding how teachers impact student outcomes--whether academic or those relating to student well-being (Blazar & Kraft, 2017).

Recommendations

Our findings indicate that using transcripts to capture a student's conceptualization of happiness/engagement is complicated. If researchers, administrators, and teachers are interested in measuring student's happiness and engagement in elementary classrooms they should consider adhering to the following strategies:

1. Stimulated recall interviews with students (Davis, 1989). This method allows children to impart insights on the thought process and behavior of other children and "provide us with a point of view to which we apparently have lost direct access." (Davis, 1989, p. 39).
2. Measure a student's level of happiness and engagement over more than one time period.

Using transcript analysis to predict students' self-reported happiness in elementary mathematics classrooms:
Methodological considerations

3. Researchers should attempt to collect contextual information such that researchers can utilize classroom, teacher, and student information to identify practices that support student engagement/happiness (McCormack, 2000).

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