



Teaching and Learning From Mistakes: Teachers' Responses to Student Mistakes in the Kindergarten Classroom

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**Teaching and Learning From Mistakes:
Teachers' Responses to Student Mistakes in the Kindergarten Classroom**

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Dedication

This is dedicated to

my mother, Cynthia, who launched me on the journey toward this accomplishment from the day I arrived on this earth;

and to my daughter, Naomi, who I hope to catapult forward on a similarly spectacular journey of her own in the years to come.

You made this possible. Thanks for inspiring me, for continuously loving me unconditionally, for believing in me, and for the joy and honor of caring for and being cared for by both of you.

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Abstract

In Kindergarten classrooms, teachers work to help students learn new information and skills but, as non-experts, students often make mistakes. Making mistakes and, subsequently, receiving corrective feedback are assets to the learning experience (Huesler & Metcalfe, 2012). Young children tend to be open-minded about mistakes, but around age five or six, they begin to develop a fear of failure – a sensitivity about making errors that can constrain their choices during learning (McClelland, 1958; Conroy, Coatsworth, & Kaye, 2007). Furthermore, previous research has indicated that student-teacher relationships exert a strong influence on the student academic and social learning experience (Pianta, Hamre, & Stuhlman, 2003). That said, presently little is known about the features of mistake-related, teacher-student interpersonal interactions in Kindergarten classrooms, and how the classroom context and community influence the responses to student mistakes during instruction.

The purpose of this dissertation study is to more deeply explore and articulate how Kindergarten teachers respond to mistakes in real-world, classroom contexts. An analysis of teacher interviews (Study 1) yielded five central themes that illustrate common ways Kindergarten teachers respond to student mistakes. Then, the method of portraiture (Study 2) was used to create rich narratives reflecting the nature of day-to-day responses to mistakes for two teachers and their respective classroom communities.

These studies offer in-depth elaborations of how teachers respond to mistakes in practice. The work is both a foundation for further research on mistakes and learning, and a resource for practitioners, school leaders, and policymakers. In particular, this research has implications for the initial training and ongoing professional feedback provided to

teachers. Taken together, the two studies can be shared with teachers, particularly those working in early childhood settings, to help them better understand the strategies used by others to help students learn from their mistakes.

Chapter 1: Introduction

“If you don’t make mistakes, you’re not working on hard enough problems. And that’s a big mistake.”

– Frank Wilczek

Young children¹ in academic situations start off as relative novices at virtually all of the tasks presented to them, such as letter writing, counting objects, and reading. However, unlike adult novices who typically have, at the very least, general knowledge or tangentially-related prior experience to draw from, children often must attempt to acquire knowledge and skills to which they have never been exposed. This high level of task unfamiliarity means that the very same task perceived by an expert adult (i.e., a teacher or parent) as “inherently” simple and straightforward can be perceived by a novice child as incredibly challenging, complex, and confusing. Additionally, the sequence and steps for a given learning task are not always logical or easily deducible through simple observation. For example, if drawing a capital letter T, even after watching a demonstration or working from a drawn example, a four-year-old may have difficulty discerning which critical identifying features of the letter are important to attend to (e.g., lines must be perpendicular to each other, line on top should be centered) versus unimportant features that may appear equally, visually salient (e.g., size of the figure, color it is written in). Just watching and imitating are not enough – in order to properly execute these and myriad other skills, deep and nuanced understanding is required.

¹ Grades Pre-Kindergarten–1

So, how does a teacher best help a young child execute these important tasks – the mastery of which will serve as a basis for future, increasingly challenging, learning activities? While experiential learning and exploring have incredible benefits for garnering student interest and promoting intellectual curiosity, an abundance of research indicates that in the case of concrete skills, direct instruction is typically the most efficient and effective approach to teach novices (Kirschner, Sweller, & Clark, 2006), like young children. In their review of relevant literature, Kirschner and colleagues (2006) suggest that teaching novel content in an upfront, formal presentation serves as an important means to organize the information and integrate it with learners’ prior knowledge, however limited it might be. This approach provides valuable structure for a young child, while simultaneously reducing the cognitive load required to process the new, unfamiliar material (Kirschner et al., 2006, p. 80). Additionally, while striving to support learners’ deep understanding, it is beneficial – if not critical – for teachers to follow their introduction to new content with an opportunity for students to participate in guided inquiry (Wiske, 1998). These scaffolded learning sessions allow students to independently apply and practice some of what they’ve just been taught, with the instructor available to provide just-in-time clarification and guidance, as needed.²

Yet even with well-timed, well-designed, and well-executed educational supports, young students attempting to execute completely unfamiliar tasks will undoubtedly make mistakes³ along the way. In fact, making mistakes is a natural part of the learning process. An important way to help a student shift from novice to expert execution of a

² This is one of several important steps in the *Teaching for Understanding* framework (Wiske, 1998), which focuses on helping students develop a nuanced grasp of processes and ways of thinking rather than simply rote repetition and memorization of facts.

³ The terms *mistake* and *error* are used interchangeably throughout the paper.

skill is helping that student to better learn from his or her mistakes. Beyond simply having a child attempt to accurately replicate the prescribed steps of a problem, teachers can illuminate the deep structure of the skills they are practicing by orchestrating experiences that push the learner to “work at the edge of their competence” (Bereiter & Scardamalia, 1993, p. 98). In doing so, some actions that begin as arduous and require great concentration can become automatized, thereby freeing up cognitive resources to reinvest in the activity (Bereiter & Scardamalia, 1993, p. 92). For the young child this means, for example, that once letter identification is firmly comprehended, mental energies can be directed toward refining the pen strokes required to properly form the letters of the alphabet by hand.

Cycles of trial, error, and feedback can allow a child to use mistakes as tools for learning, helping him become an increasingly proficient practitioner of a particular skill. It is ideal to design instructional environments that keep a student in what Vygotsky termed the Zone of Proximal Development (ZPD), defined as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). It truly takes a skillful teacher to maintain high levels of individualized support and feedback for a classroom full of young students. In the ZPD, each child must be supported in a different way – if the work is too easy for her, she’ll lose interest; but if it’s too challenging, she’ll get frustrated – and these needs are changing over time.

This dissertation is a focused exploration of how Kindergarten teachers respond when students make mistakes in their classrooms. It also offers key insights into the

complex network of individual, contextual, structural, and pedagogical factors that shape student-teacher interactions related to mistakes. I explore this topic of teachers' responses to mistakes in Kindergarten via two main studies. In Study 1, I use the method of interviewing to address my first driving research question: *What are some of the characteristics of Kindergarten teachers' attitudes, beliefs, and practices regarding how they respond to student mistakes in the classroom?* Based on line-by-line emergent coding and thematic analysis of teacher interview transcripts, I identify five central themes that reflect common ways that the participating teachers respond to mistakes. In Study 2, I examine the mistake-related interactions between Kindergarten students and teachers, using the method of portraiture to answer a second central research question: *Looking closely at two Kindergarten teachers in context, what is the nature of daily teacher-student interactions regarding mistakes?* Drawing on fieldnotes, video recordings, interview data, and examination of classroom artifacts, I offer detailed, narrative depictions of two teachers in their classrooms – one in an inner-city public school and the other in a suburban public school.

This dissertation is comprised of five chapters. I start with an overview in Chapter 1, this introductory chapter. Chapter 2 is a review of relevant literature on the role of mistakes in learning and teachers' responses to mistakes. In Chapter 3, I present the findings of the interview study with public school Kindergarten teachers. Chapter 4 contains portraits of two teachers' responses to mistakes, in situ. And Chapter 5 is my Conclusion, where I briefly discuss similarities and differences across the studies, and share some of the limitations and implications of this research.

Chapter 2: Literature Review

The Relationship Between Mistakes and Learning

A robust segment of research in the field of psychology explores the connection between making mistakes during practice and the future retention and recall of information. The first step in the sequence of error processing is the recognition that an error has been made. While an individual may recognize the mistake without prompting, error recognition is more commonly the result of feedback embedded in the execution of the task. In a classroom context, this can take a number of forms, including a spoken or written comment made by a classroom teacher. In laboratory studies, the feedback to participants' input often takes the form of a message provided on a computer screen or an audible signal.

Several researchers have conducted studies that specifically examine how errors are related to 1) individuals' subtle outward responses to error (i.e., reaction times) and 2) how well information has been learned, as demonstrated by retention and recall of the information. Studies have shown that trial and error learning is likely the ideal approach for the average learner (Clare & Jones, 2008; Huesler & Metcalfe, 2012). By comparison, overlearning – or continued practice after demonstrating an error-free performance of a task – was found to have no positive effect on improving long-term retention of memorized information. For example, Rohrer and colleagues (2005) investigated whether or not increasing the number of times a participant cycled through a set of flash cards with novel word-definition pairs had an effect on retention. In that study, one group of participants went through the cycle five times, while the other group repeated ten times. Although one week later there was a notable benefit to having the additional practice, the

“heavy” cyclers completely lost their advantage after four weeks, and both groups demonstrated identical performance levels on the final assessment. So, while there are some short-term improvements in retention of information, in the long run, overlearning seems to be “inefficient almost to the point of wasting time” (Pashler, Rohrer, Cepeda, & Carpenter, 2007, p. 189-190). Furthermore, when accompanied by feedback, producing an error can actually be helpful to the retrieval of information from memory (Kornell, Hays, & Bjork, 2009; Huesler & Metcalfe, 2012). Even when a learner does not know the answer and makes a mistake while guessing, it still does not hurt learning (Pashler et al., 2007); and the “interfering effects of wrong guesses did not appear even after a 1-week delay” (Kang, Pashler, Cepeda, Rohrer, Carpenter, & Mozer, 2011, p. 5).

Since mistakes have the potential to serve as a positive influence on memory and retention of information, it is important for teachers to consider what type of feedback is most helpful to a student who has just made a mistake. Over the course of several studies that employed controlled, laboratory-based tasks, researchers Huesler, Metcalfe, and Finn have found that it is absolutely critical to tell a learner whether or not her response is correct and, if a mistake has been made, to offer corrective feedback that indicates the proper response. According to this body of work, corrective feedback is required in order to transform mistakes into learning opportunities, as opposed to simply indicating whether a particular response was correct or incorrect or allowing the individual to “answer until correct” – choosing from an array of multiple choice answers until the correct response is selected. Otherwise, an individual is likely to hold on to the previously incorrect answers, as demonstrated by repetition of these same errors in future, poor performance (Huesler & Metcalfe, 2012; Finn & Metcalfe, 2010). Similarly, Pashler,

Cepeda, Wixted, and Rohrer (2005) found that feedback given regarding errors during practice sessions led to five times greater correct recall when tested. Also, Pashler et al. (2007) found that when learning material with a single right answer (e.g., obscure facts, word pairs), it is critical to provide feedback that clearly indicates the correct response, regardless of whether the learner's initial guess was wrong or right. In particular circumstances, receiving corrective feedback can be more effective than simply studying (Huesler & Metcalfe, 2011); and in a testing situation, with the right amount of spacing between response and correction, feedback can also serve to strengthen memory for correctly recalled responses (Smith & Kimball, 2010; Pashler et al., 2007).

In addition to the feedback given, the constraints and demands of the particular task at hand may also have an impact on the learner's response to error. For example, Crump and Logan (2012) conducted a study examining typists' responses to mistakes during a typing test. Their results suggest that task demands (e.g., expectations of perfection), deadline flexibility, repeatability, and opportunity for deletion or erasure all have an impact on whether a learner's response will tend toward prevention (post-error slowing of typing speed) or cure (correction after an error has already taken place). Additionally, many researchers over several decades have explored whether or not requiring students to generate a part or all of their answers has an impact on subsequent recall. In a robust meta-analysis of 86 studies on this "generation effect," Bertsch, Pesta, Wiscott, and McDaniel (2007) used statistical methods to compute a more reliable estimate of population effect sizes, adjusting for sampling error across several prior studies spanning 1966-2005. They found "strong positive effects (0.28-0.92)," particularly when "subjects were asked to generate an entire target (0.55) versus only part

of the target (0.32)” (p. 206). In recent work, Huesler and Metcalfe (2012) nuanced these assertions by focusing on the types of errors made when a response is generated. This team found that when generated errors were semantically related to the target response and the subjects received feedback about their mistake, learning improved. This finding helps to illustrate just how important it is to attend to the study content and educational circumstances in which mistakes and feedback are embedded, and implies that there is a direct, albeit currently unspecified, relationship to the quality of task execution.

In the psychology literature, only three studies were located that focus on error and learning for young(er) learners, and all of them focus on comparing the effects of error feedback on students at different developmental levels. In the first study, Metcalfe and Kornell (2007) compared a group of Columbia University students to a class of inner-city, 6th grade middle school students from the Bronx. They found that for both groups, “feedback had a large and important beneficial effect on learning. Most often, when no feedback was given, responses that were initially wrong simply stayed wrong” (p. 229). In the second study, Metcalfe, Kornell, and Finn (2009) looked at the performance of 27, 6th grade children enrolled in The School at Columbia University, and later examined that of 20 Columbia University students. The authors found that while both groups experienced benefits from feedback (as compared to no feedback), the children experienced a benefit from delayed feedback when the lag time between the practice and test was controlled; the adults did not. And in the third study, conducted with 3rd and 6th grade Bronx students, Metcalfe and Finn (2011) examined the “hypercorrection effect,” defined as the tendency for errors made with relatively higher confidence to also be the most likely corrected in subsequent assessments. They found

that, for both children and young adults, errors made with high confidence are quite easily corrected with corrective feedback (Metcalf & Finn, 2011, p. 260). Although these three studies represent the beginning of the efforts by Metcalfe and colleagues to explore how mistakes impact younger students' learning processes, there remains much work to be done to understand how the vast literature on error is the same or different for 6th grade students, as well as younger preschool and Kindergarten children.

Although there is a wealth of research supporting the claim that learners' processing of error and feedback is beneficial to learning in a variety of particular ways, this literature does have several areas that could use a great deal more exploration. An important caveat when interpreting these findings is that researchers have only explored the workings of error in particular laboratory contexts. All of these studies use computers to present questions during the assessments, most often with no human assistance and no interpersonal interaction, both of which are key elements of early childhood classrooms. Additionally, the key learning outcomes involve memorization of basic, decontextualized facts, including associations between vocabulary words and their definitions (Metcalf & Kornell, 2007; Metcalfe, Kornell, & Finn, 2009); foreign language synonym pairs (Pashler et al., 2007); weakly-associated word pairs (as opposed to entirely unrelated word pairs; Huesler & Metcalfe, 2011); as well as retention of correct responses to obscure trivia facts over certain periods of time (Kornell et al., 2009; Finn & Metcalfe, 2010; Kang et al., 2011; Smith & Kimball, 2010; Metcalfe & Finn, 2012). Also, these studies focus on fairly low-stake, informational content, but do not necessarily speak to more complex understandings that require deep processing in order to be useful to students—for example, activities that help build more sophisticated problem-solving,

logical, and critical-reasoning skills. And finally, although well-vetted in adults, very few studies were located that test these various effects of error in young children's performance. In scanning the rich and detailed research landscape of work on error and learning, it seems that few researchers have explored how or if these findings with mostly young adult participants translate to learning experiences with young children (Huesler & Metcalfe, 2011).

While these laboratory tasks do provide an important, broadly-applicable glimpse into the relationship between mistakes and learning, they also leave many questions unanswered regarding a child's inner experience of mistakes, and implications for teachers working in the classroom.

Learners' Physiological and Emotional Responses to Making Mistakes

Error can be simply defined as "a deviation from intended behavior" (Taylor, Stern, & Gehring, 2007, p. 169) and, in the neuroscience literature, the Error-Related Negativity (ERN) "represents the first indication that the consequences of an action are worse than expected" (Holroyd & Coles, 2002, p. 694). Simply put, the ERN is a time-locked, neural electrical impulse in the brain that is indicative of error identification.⁴ Beginning with ground-breaking work by Gehring, Goss, Coles, Meyer, and Donchin (1993), a substantial base of literature has employed electroencephalogram (EEG) to explore the attributes of this neural response to error (Hajcak, 2012). Additionally, by

⁴ A technical definition: The Error-Related Negativity, or ERN, is defined as a negative (upward on the EEG) deflection in the error waveform (or the pattern of peaks in electrical activity associated with making a mistake) that appears roughly 50-100 milliseconds after an incorrect behavioral response (i.e., when subject actually gave a wrong answer, as opposed to simply when presented with a stimulus to respond to) and is largest at the "fronto-central midline electrodes (FCz, Cz)" (Handy, 2005, p. 309; also Wiersema et al., 2007; Davies et al., 2004; Torpey et al., 2011; Torpey et al., 2009; Brooker et al., 2001; Kim et al., 2007).

juxtaposing EEG work with findings from several fMRI studies, several researchers point to the anterior cingulate cortex (ACC), a region of the medial prefrontal cortex (mPFC) in the brain, as the probable source of the ERN signal generation (Holroyd & Coles, 2002; Wiersema, 2007; Meyer, 2012; Taylor et al., 2007). Upon examination of numerous studies focused on the ACC, Santesso, Segalowitz, and Schmidt (2006) stated that the main purpose of the ACC is “to detect conflict or errors in the cognitive system (as well as their emotional significance), resulting in an engagement of their prefrontal regions to execute strategic control” (p. 473). They found this neural response to correspond with other physiological changes to the body in reaction to error (e.g., heart rate slows, skin-conductance responses, heightened startle response), indicating a global physiological response to error (Hajcak, McDonald, & Simons, 2004). This highly interconnected region of the brain is thought to be the means by which “affect and intellect can be joined” (Devinsky et al., 1995, p. 298).

Contextual influences on the neural response to error. The perceived significance of the error to the person who committed the error – a subjective and often socially-influenced appraisal – can have a direct impact on the size of the ERN in a particular learning situation. With less personal investment in “getting it right,” there is a lesser ERN (Taylor et al., 2007; Gehring et al., 1993). It is not surprising that researchers have observed a greater ERN in people with high anxiety (Torpey et al., 2009), and among people with perfectionistic tendencies like Obsessive Compulsive Disorder (Gehring, Himle, & Nisenson, 2000), including children (Hanna et al., 2012). Furthermore, there is some emerging evidence in the field of genetics that suggests that the ERN is a heritable biomarker of anxiety disorders (Anokhin, Golosheykin, & Heath,

2008). Although the stress induced by a particular situation can also have a great impact on the ERN by decreasing the mPFC network connections, researchers found that alleviating the source of stress allows the connections to grow back, reversing the adverse effects (Segalowitz & Dywan, 2009, p. 859-860). Furthermore, a recent study has found that specific characteristics of the learning environment can also mediate error significance and thereby affect the size of the ERN (Riesel, Weinberg, Endrass, Kathmann, & Hajcak, 2013).

Based on the current body of research, it is clear that the neural impulse of the Error-Related Negativity coincides with the recognition of error, and that its amplitude is mediated by various individual traits that govern the subjective appraisal of its importance. While there is a robust literature exploring various facets of the Error-Related Negativity in the brain, the subjects of these studies are usually adults (particularly young adults/college undergraduates). Although several researchers are paying greater attention to this area of focus (Arbel & Donchin, 2010), several authors working in the space have admitted that currently, there are limited studies focusing squarely on children's error processing (ERN) in the brain (Brooker, Buss, & Dennis, 2011; Torpey, Hajcak, & Klein, 2009; Wiersema, van Der Meere, & Roeyer, 2007; Santesso, Segalowitz, & Schmidt, 2006). In one of these studies, Kim, Iwaki, Imashioya, Uno, and Fujita (2007) have been able to reliably elicit the ERN response in children as young as 5 years, and found that "children's ERN in the go/no-go task attains adult status at about the age of 9-11" (Kim et al., 2007, p. 189). Additionally, although Santesso et al. (2006) and Wiersema et al. (2007) both found late development of the ERN, they also examined additional measures of error processing (i.e., Error-Related Positivity (Pe),

Correct Related Negativity (CRN), post-error slowing, facial expression, and other outward responses) and found that on these other measures, children performed similarly to adults.

Connections between neural response, emotion, and subjective appraisal of error. In the neuroscience studies just described, physiological responses can be measured and analyzed in order to determine the body's reaction to error, and the nature of neural responses to error are well-established in adult populations and in laboratory conditions. In recent years, some scholars (like Kim) have begun to more closely investigate how the ERN functions in children, as well. However, as commented by several scholars who study the error response, there remains a need to translate these research findings into useable knowledge for educators working in real-world situations and/or with younger students (Pashler et al., 2007; Rohrer & Pashler, 2010; Huesler & Metcalfe, 2011). With the exception of Kim and colleagues, the currently employed techniques generally include text-dependent response monitoring tasks (like the flanker task) and complicated instructions that must be read by the participant – practices that are too cognitively challenging for Kindergarteners.

Additionally, studies often have identified that emotional response plays a role in the magnitude of the ERN, but physiologically-based methods prevent the robust measurement of the emotional appraisal of error that governs the neural response. In seeking to unpack the ways in which the neural responses are influenced by the emotional appraisal of the mistake, it seems that there is no clear-cut way to segment out the self from the context in which the self is embedded. The bottom line is that the way people

assign emotional salience to an experience is important for understanding the engagement of an individual in that experience.

Relevant theories on emotional appraisals. Broadly, emotional appraisal has long been an area of focus in psychology. Early theorist Arnold (1960) defined appraisals as “direct, immediate and intuitive evaluations to account for qualitative distinctions among emotions” (Arnold, 1960, as cited in Ellsworth & Scherer, 2003, p. 572). Numerous researchers have extended the framing of appraisals as the basis of variability in emotional reactions, particularly asserting that 1) an expressed emotion is a function of a highly-individualized appraisal of the situational implications for their well-being, and 2) different evaluations predictively elicit different emotions (Smith & Kirby, 2009; Smith, Haynes, Lazarus, & Pope, 1993; Roseman, Spindel, & Jose, 1990).

With this theory in mind we know that, on a very basic level, there is wide individual variation in the experience of emotion, both across individuals and within the same individual across time and various contexts (Smith & Kirby, 2009). Furthermore, many appraisal theorists suggest that these emotions are not easily parceled into discrete, labeled emotions like fear or anger, but are multi-dimensional and dynamic (Ellsworth & Scherer, 2003). Kuppens, Oravecz, and Tuerlinckx (2010) found that people have an “affective home base,” or emotional baseline, that can be measured along two axes – emotional valence (unpleasant to pleasant) and emotional arousal (deactive to active). For example, while situated in the same external environment, one person could report feeling very pleasant at a low level of arousal, while another individual sitting next to her could, in his own default state, report feeling slightly unpleasant at a moderate level of arousal. Kuppens et al. (2010) observed that people’s emotional states are constantly

adjusting to their surroundings; but once the stimulus is removed, their emotional state is “attracted” back to the attributes of their original baseline state (p. 13). Additionally, while the magnitude and direction of an individual’s emotional response to a given stimulus is unique, the baseline itself is also in flux, reflecting the emotional adjustments a person makes from one day to another or in different contexts. In sum, people have powerful, consistent, but malleable emotional tendencies that color the appraisals of the situations that arise in their lives.

Additionally, these personal, emotional orientations and assessments of the situation not only profoundly influence in-the-moment decision-making, but also connect to future responses to similar situations. Fredrickson’s (2001) “broaden-and-build” theory of positive emotion “posits that experiences of positive emotions *broaden* people’s momentary thought-action repertoires, which in turn serves to *build* their enduring personal resources, ranging from physical and intellectual resources to social and psychological resources [emphasis added]” (p. 218). It follows that a learner is more likely to take intellectual risks and consider more possibilities when in a more agreeable emotional state (relative to his or her affective homebase). Similarly, there is a marked constriction of the suite of options an individual is willing to exercise when in a negative emotional state. The biopsychosocial model (BPSM; Tomaka, Blascovich, Kelsey, & Leitten, 1993; Tomaka, Blascovich, Kibler, & Ernst, 1997) suggests that in response to an event (like making a mistake, for example), an individual evaluates several attributes of the stimulus, including safety/danger, uncertainty/certainty, attitudes, beliefs, etc. With these subjective assessments, individuals quickly decide whether they are facing a challenge or a threat. Holding both of these “task demands” and various self-determined

levels of personal resources in mind, Tomaka et al. (1993, 1997) suggest that these factors feed into a sort of “mental calculus” that helps a person determine the appropriate response to the situation. If personal resources are greater than the perceived demands, then it is deemed a challenge; if personal resources are less than the perceived demands, then it is viewed as a threat (Blascovich & Mendes, 2008, p. 439).

Jointly, these perspectives illuminate the power of the subjective emotional assessments people inwardly make about their own behaviors and performance. If a student in a learning situation perceives a mistake as a strongly negative emotional experience (threat), the range of options he is willing to consider is likely narrowed. With greater sense of uncertainty, less familiarity with the task, more pessimistic attitudes and other more negative assessments of self and situation, a learner may lean more toward a threat ratio, concluding that personal resources are simply insufficient for the task at hand.

Young children’s emotional responses to mistakes. Several well-established segments of the educational psychology research literature provide important insights into the role of emotion in young children’s responses to mistakes. These incorporate elements of both the observed outward expression of emotion and the impact of that expression on future action. Self-evaluation (how children appraise their own performance) has been tied to children’s affective experience of the error and feedback. Decades of work on achievement motivation seem to reflect that the affective response to errors is influenced by 1) the type of feedback given and 2) a child’s previously-shaped orientation toward mistakes. Taken together, these theoretical lenses comprise the best-

informed perspective from the currently available literature that helps to explain the impact of mistakes on a young child's emotional responses.

Self-evaluation. In their early work, Bandura and Cervone (1986) defined self-evaluation as the level of satisfaction or dissatisfaction with one's own performance, as measured in comparison to subjectively-determined standards and expectations. These standards can include "one's prior performance, another person's performance, or an absolute standard of performance" (Zimmerman, 2002, p. 68). Even a five-year-old child has the ability to be self-evaluative, and the judgments of self are related to subsequent affective responses and task performance (Ruble, Eisenberg, & Higgins, 1994). In order to best leverage this emotional gauge when making behavioral adjustments for the future, self-evaluations should be both "reasonably accurate" in relation to the person's skill (Zimmerman, 1998, p. 78) and temporally related to the task at hand (Halisch & Halisch, 1980). In their monograph titled *Self-Evaluation in Young Children*, Stipek, Recchia, McClintic, and Lewis assert that, with children, these "evaluations of their competencies and behavior affect their emotional experiences in particular situations, their behavior in similar situations in the future, and their emotional well-being in the long term" (1992, p. 1).

Numerous studies have found that very young children tend to look on the bright side of things regarding how they evaluate their own performance. When asked to rate their performance on a task, they give themselves higher marks than older youth, and apply negative/failure feedback to a lesser degree (Ruble, Eisenberg, & Higgins, 1994; Stipek & Mac Iver, 1989). Some researchers have observed that this "sensitivity for success develops earlier and stronger than that for failure" (De Bruyn & van den

Bercken, 1982, p. 489). Ruble, Parsons, and Ross (1976) found that “task outcome was a strong predictor of evaluations, especially for older children” (p. 990), meaning that if these children succeeded at the task, they were more likely to evaluate their performance positively, and vice versa. As they grow older, children become increasingly prone to externalize the attributions for success, and also become better able to realistically interpret the feedback received from others about their performance regarding their personal abilities and limitations (Nolen-Hoeksema, Girgus, & Seligman, 1991, as cited in Yates, 2002, p. 11).

These ratings tend to be higher for younger children who are attempting so many novel tasks because the valence of the self-evaluation of one’s own error can substantially impact a child’s emotional response and engagement in the task. In an eye-tracking study, Zentall and Morris observed that “more fixations on errors were related to lower persistence and lower self-evaluations” (2012, p. 1073). This means that being less attentive to the mistakes younger children make can potentially benefit learning; they notice their errors but do not obsess about them, and thereby avoid negative affective responses that older children and adults might experience. Additionally, a study by Gentzler, Wheat, Palmer, and Burwell (2013) found that children who reported higher levels of rumination – defined as “repetitive, self-focused thoughts on one’s sad emotions and on the causes and implications of those feelings” (p. 305) – also made more self-blaming statements during a solvable puzzle after recently failing to complete an insolvable puzzle (p. 308). So, children who were prone to ruminate tended to dwell on the emotions associated with a negative self-evaluation of their errors, and getting stuck in that negative emotional space negatively impacted evaluations of future tasks.

Achievement motivation. The achievement motivation literature offers another important lens to understanding how children respond emotionally to mistakes in classrooms. Weiner (1985) theorized that the two most salient causes to which task performance is typically attributed are ability and effort (p. 554), and that the perceived locus (source), stability, and controllability of one's achievement directly influences emotional expression and motivation to persist at a task. Over the years, researchers have focused on understanding and defining how the orientation toward achievement impacts learning choices. Numerous researchers have explored these ideas over the past several decades, most notably Carol Dweck and colleagues (e.g., Dweck & Reppucci, 1978; Licht & Dweck, 1984; Smiley & Dweck, 1994), who studied the actions of young children. In that literature, a distinction has been drawn between performance achievement goals and mastery achievement goals. Performance goals are concerned with attaining success in order to preserve the outward appearance of intelligence, as evidenced by the flawless execution of skills. Students with a performance orientation toward achievement have a fixed view of intelligence, or fixed mindset (Dweck, 2009), and tend to believe that if they cannot execute a skill, it is because they are not "smart" in that area. As a result, a person may shy away from or have an adverse reaction to situations in which they make mistakes, demonstrating avoidance behaviors, including helplessness or agitation. On the other hand, students with a mastery orientation, or growth mindset, toward achievement welcome the challenges of practice because they believe they can learn from failures and that with enough effort, they can build toward better skill execution.

Studies that are focused on achievement motivation often center on the type of feedback provided to the learner (commonly termed “success feedback” or “failure feedback”), examining emotional responses and the learner’s willingness to engage in additional, similar tasks. A large body of literature indicates that the type, timing, and even the specific wording of feedback given to a learner exerts a powerful influence on an individual’s motivation to complete a task. Hattie and Timperley (2007) define feedback as “information provided by an agent (e.g., teacher, peer, book, parent, self, experience) regarding aspects of one’s performance or understanding” (p. 81). In their review of numerous studies and prior meta-analyses on the topic, the authors concluded that feedback is most effective when it is immediate, positive, corrective, specific, and connected to the students’ prior actions.

The valence of the feedback offered can differentially impact children’s affective states in learning situations. Generally, success feedback prompts a more positive emotional response, and failure feedback prompts a more negative affective response. Nichols, Whelan, and Meyers found that “children who received failure feedback reported a more negative mood than children who received success feedback regardless of goal condition” (1991, p. 497). More specifically, Meserole (1999) found that children who were given success feedback on a task tended to have more positive affect and were more inclined to predict positive future performance. Additionally, Meserole found that feedback focused on the failure but related to the learning process was correlated with more positive affect than failure feedback focused on the final outcome. In terms of making mistakes while learning, negative affect is commonly associated with “school-like” errors; as such, the tendency is for students to select less challenging tasks so they

can more easily secure academic success (Clifford, 1988, as cited in Turner, Thorpe, & Meyer, 1998).

Beyond the style of feedback, various studies have classified participants as being “mastery oriented” or “performance oriented” and examined the impact of failure on future learning choices. The consistent finding is that children with mastery/learning goals (rather than performance goals) respond to “failure feedback” about task execution with a relatively more positive affective response. Nichols, Whelan, and Meyers observed that “learning goal subjects reported more positive mood than performance goal subjects regardless of feedback condition” (1991, p. 497). These young individuals with greater focus on mastery tend to be more optimistic, remaining resilient and positive in the face of challenging tasks, and maintaining better performance in later grades (Yates, 2002). In reflecting on the body of literature on the topic, Turner, Thorpe, and Meyer (1998) acknowledge the role of negative affect in the relationship between a student’s performance goals and the academic choices made in response to failure (p. 759). For example, in a study of four- and five-year-old children’s responses to “success” and “failure” puzzle tasks, Smiley and Dweck, (1994) observed that:

“Learning goal children set higher standards for themselves...[Confident children displayed] moderate levels of performance concern during failure [and] managed to remain engaged, strategic, and emotionally positive as they worked on the insoluble puzzles...[and] Performance goal children with low confidence...experienced markedly more negative emotion, more disengagement, and far less strategic thinking than either of the other goal-confidence groups during the task” (p. 1739-40).

The authors' observations demonstrate particular patterns of response to failure, categorizing participants based on observed behaviors. Although the final results are clearly and directly stated, the full context of the testing situation, beyond the basic procedure, is not captured in these articles. For example, Smiley and Dweck (1994) use puzzle tasks, and refer to them as "solvable" and "insoluble" puzzles, but do not describe exactly what makes them so. Hence, the precise nature of the errors are somewhat obscured, and it is difficult to envision their similarity or dissimilarity with common classroom tasks. Also, both the children and their statements are assigned to categories based on their verbal responses, such as "Confident and Not Confident Performance goal children" (p. 1734), which inherently does not acknowledge the specificity of these behaviors to the particular research setting. Furthermore, in the same study, the four- to five-year olds are asked to rate their own emotions during the puzzles, which may be an overly tasking and metacognitive endeavor for this age level. In sum, Smiley, Dweck and others can offer a good sense of trends and types, but children's emotional reactions are not described in sufficient detail to provide the reader a clear view of their individual, lived, emotional experiences related to error response during the study.

Alternative view: Negative emotions can help learning. An important critique of the achievement motivation literature is that it creates a very binary view of the response to feedback—either you are "oriented" toward mastery or toward performance; either you have positive or you have negative affect/mood in response to error. Dweck and others rarely speak to the particulars regarding how the emotions relate to the circumstances under which the children demonstrate these behaviors, or more deeply describe the nature of the emotions experienced. In work examining cognitive disequilibrium during

cognitively taxing learning tasks, D’Mello and colleagues push to more closely examine the nature of these emotional responses. The “big six” emotions (anger, sadness, happiness, surprise, fear, and disgust) are often the focus of most emotion research but are not generally relevant in challenging learning situations, in which happiness, anxiety, confusion and frustration are the status quo (Lehman, Matthews, D’Mello, & Person, 2008). According to Graesser and D’Mello (2012), the moment-to-moment emotions experienced during complex learning challenges are dynamic, multifaceted, and not easily pinned down to a particular label; emotion is more aptly defined as “any social-affective state that noticeably deviates from a neutral base state” (p. 186). When facing the errors, misunderstandings, and lack of clarity in a learning situation, students in emotion-laden states like confusion have been found to experience enhanced later recall—as long as they are accompanied with proper educational supports and a clear resolution (D’Mello, Lehman, Pekrun, & Graesser, 2012). However, in their extreme forms, confusion and frustration can lead learners to task disengagement or boredom, which are detrimental to learning (D’Mello et al., 2012).

As this work is in its early years, these hypotheses have not been tested with children, nor with a specific focus on response to error. There is much work to be done to explore how these findings relate to our understanding of young children’s error processing, and yet even more effort will be needed to link them specifically to the classroom context.

Inextricably linked: Context shapes the emotional experience of error.

Perhaps due to the enormous measurement challenges in trying to study such complicated and deeply internal processes, the bulk of the research on the error experience (i.e.,

physiological and the emotional responses) focuses on identifying and classifying trends and patterns of observable behavior. In the quest to control for the messiness of context and to quantify these aspects of the human experience, researchers have focused largely on categorization in controlled laboratory settings, as opposed to exploring how these internal processes unfold in real-life.

While the research indicates that the experience of error is both individualized and predictive of future actions, myriad contextual factors color how a young child experiences a classroom-learning situation, deeply impacting the response to mistakes. The valence of a young child's relationship with his or her teacher has been found to have a profound effect on student achievement (3-5 year olds; Palermo, Hanish, Martin, Fabes, & Reiser, 2007). Further, their classmates' orientation toward academic performance has also been associated with individual students' academic achievement levels (1st grade students; Skibbe, Phillips, Day, Brophy-Herb, & Connor, 2012). "Cultural differences, whether due to temperament or direct socialization of cultural values, influence how children respond to achievement situations" (Lewis, Takai-Kawakami, Kawakami, & Sullivan, 2010, p. 53). The specific wording of praise or feedback given to the student by teachers can influence the child's future response to academic challenges (Zentall & Morris, 2010), and the frequency with which feedback is given impacts academic performance as well (Meyer, Wardrop, Hastings, & Lynn, 1993). Even the arrangement of the furniture in the classroom can impact social interactions during learning activities, and thereby impact a child's academic engagement and performance (Wannarka & Ruhl, 2008). This short list is by no means comprehensive; these are just a small number of the

contextual factors that can shape an individual child's emotional perspective and academic performance while in a given environment.

The bottom line is that the meaning of a mistake is truly understood only in the context of a particular individual, at a particular moment, engaging in a particular task. During a learning experience, physiology, emotion, and context together form the basis of an individual child's appraisal of a stimulus or situation (i.e., receiving feedback about a mistake). Because of this relational interplay between person and context, it is impossible to parse the emotion by itself, as it is always swept up in both the experience and the appraisal (Lazarus, 2006). Context is intricately intertwined with the emotional appraisal, and this shapes and molds the experience. Even across cultures, it has been observed that "emotional responses are largely determined by the way events are appraised" (Mauro, Sato, & Tucker, 1992, p. 301). And although flexible, "the manner in which internal states are interpreted can have profound effects on emotions, physiology, and behavior" (Jamieson, Mendes, Blackstock, & Schmader, 2010, p. 211). Furthermore, the individual differences in these appraisals can mean that negative feedback, such as telling a person they did something wrong, can impact future cognitive performance (Raftery & Bizer, 2009).

In light of this complexity, there is much work to be done to deeply understand the nuance of how the appraisal of and subsequent response to error play out in young students' day-to-day academic lives. As reviewed earlier, the literature seems to indicate that appraisals are powerful forces, and that avoiding a (largely) negative appraisal of error can make a big difference in the repertoire of actions in which a learner engages. At the same time, appraisals are also deeply internal to the human experience, and are often

evaluated implicitly without constructive, metacognitive reflection about what is being felt and the choices being made. Although over the past decade Scherer and others have begun to address the links between cognitive appraisal and emotion (e.g., Scherer, 1999), only two studies, to date, have focused on the study of emotional experiences – specifically classroom contexts – and both are focused on students in early adolescence (Ahmed, van der Werf, & Minnaert, 2010; Levitt, Guacci-Franco, & Levitt, 1994). Teacher-student relationships and interactions have the potential to serve as a powerful influence during learning, particularly in early-childhood classrooms (Pianta, Hamre, & Stuhlman, 2003). Therefore, it is critical to consider the nature of teachers' responses to young students, and the ways in which their interpersonal interactions and social dynamics in the classroom may shape learners' perceptions of and responses to mistakes.

Teachers' Responses to Student Mistakes

Factors influencing teacher responses to mistakes in learning. To date, little is known about what Kindergarten teachers and students actually do and believe as it pertains to mistakes, the nature of student-teacher interactions around mistakes, and the role of classroom culture and other contextual factors in the learning environment (Tulis, 2013; Seifried & Wuttke, 2010). With just one exception (Schleppenbach et al., 2007), the studies identified during an extensive search of the literature on teachers' responses to mistakes feature students in 3rd grade or older, and there was no discussion of any grade level differences in error response. That said, there are several studies focused on older students that provide important insights generally relevant to the topic at hand.

The interpersonal dynamics of a classroom have a profound influence on the way mistakes are perceived, discussed, and used during teacher-student interactions. When

students feel that it is not emotionally safe to make mistakes, the mistakes become barriers to understanding, leading students to “avoid taking risks and be more likely to hide their errors instead of communicate their misconceptions” (Rybowiak, Garst, Frese, & Batinic, 1999; Tulis, 2013, p. 57). These concealing behaviors can diminish the potential to leverage mistakes as learning opportunities. Higher levels of student understanding are cultivated when the classroom culture promotes the constructive use of mistakes as tools for learning (Kazemi & Stipek, 2001; Bray, 2011).

Making mistakes is also important to building knowledge and developing learning routines (Oser & Spychiger, 2005; Seifried & Wuttke, 2010). Typically, the experience allows students to 1) clarify ideas of what is right and wrong as compared to a given norm and 2) develop strategies to help prevent the repetition of the mistake in the future (Heinze, 2005). When mistakes are framed as “springboards for inquiry” (Borasi, 1994), students feel encouraged to “examine and critique their own and others’ thinking” (Schleppenbach, Flevares, Sims, & Perry, 2007, p. 132) and are more inclined to engage with the ideas and methods, developing arguments rather than simply seeking correct answers from an educator or authoritative text (Bray, 2011).

Several factors shape how teachers respond to error in practice. Teacher beliefs about “the nature of the subject matter, about how students learn, and about the role that classroom participants should play” (Stigler & Hiebert, 1999, as cited in Santagata, 2004, p. 142) can guide their actions. Teachers’ error handling approaches may also vary depending on the ability level of the student (Hoffman & Clements, 1984; Heinze, 2005) and the teacher’s estimations of students’ potential reactions to making mistakes (e.g., teachers do not want to shame students) (Bray, 2011; Pajares, 1992; Cooney, Shealy, &

Arvold, 1998). This demonstrates the ways in which teaching is “an interplay of classroom practices with local notions of appropriate ways to socialize children's thinking” (Santagata, 2004, p. 161).

The ways teachers manage instances of mistakes have a strong influence on student perceptions, attitudes, and reactions concerning mistakes and can directly influence a student's affective state (Steuer, Rosentritt-Brunn, & Dresel, 2013). Positive orientations toward error are associated with positive orientations toward learning (Seifried & Wuttke, 2010). It follows that teachers' positive attitudes toward mistakes promote student adaptive responses, while teachers' negative attitudes sustain student insecurities (Tulis, 2013). Several scholars have noted that it is important to decrease the anxiety students feel about making mistakes by framing them as natural and common, so students are more open to using them to improve their skills rather than simply feeling discouraged (Santagata, 2004; Heinze, 2005; Schleppenbach et al., 2007).

Effective handling of mistakes in classrooms requires several types of teacher expertise. Clearly, content-level expertise is needed for error identification (Bray, 2011). Beyond that, teachers need to be expert at handling mistakes, as demonstrated by the ability to “successfully interpret student errors in the moment and formulate clear, conceptually based questions and explanations” (Bray, 2011, p. 31). This entails asking questions that represent a variety of approaches relevant to a given problem (Schleppenbach et al., 2007), as well as simply knowing when to move on in the conversation (Ball, 1993). Also, more expert teaching is often characterized by advance consideration of likely student mistakes and misunderstandings, as well as some

forethought about her/his own response in those situations (Meyer, 1986; Borko & Livingston, 1989; Schleppembach et al., 2007; Bray, 2011).

In conclusion, there is a complex universe of factors that shape and mold teachers' error responses. When teachers provide feedback to students, they initiate a complicated interpersonal exchange that is influential on student learning.

U.S. teachers' responses to mistakes: Insights drawn from cross-cultural comparisons. In recent years, a small but strong German research program has emerged, producing several studies focused on specifying the ways that teachers respond to student errors. Two key objectives in that research have been to quantify 1) teachers' levels of error tolerance through international comparisons of classroom video observations (e.g., Heinze, 2005) or case study (e.g., Tulis, 2013); and 2) students' levels of error tolerance and corresponding affective states as evidenced by observations and self-report measures (Seifried & Wuttke, 2010; Steuer, Rosentritt-Brunn, & Dresel, 2013). While this body of work is conceptually relevant to the topic at hand, it is largely unknown to what degree these and other international findings translate to U.S. contexts, given that cultural norms about making mistakes can vary dramatically from one country to the next (Santagata, 2004; Tulis, 2013).

Cross-national studies have highlighted a variety of mistake-handling practices unique to U.S. teachers. In an analysis of video-recorded first and fifth grade math instruction and accompanying teacher interviews, Schleppembach and colleagues (2007) found that Chinese teachers devote more time and attention to the discussion of errors than U.S. teachers. Teachers from both cultural groups expressed the belief that making mistakes helps students learn. However, U.S. teachers viewed mistakes as an indicator of

failed learning, while Chinese teachers used them as benchmarks for what is yet to be learned, were much more likely to “dwell” on errors, and were more instrumental in their practical use of student mistakes during teaching (Schleppenbach et al., 2007).

Santagata’s (2004) video study of teacher mistake-handling in eighth grade mathematics classes similarly found that American teachers were more guarded than Italian teachers in the ways they addressed mistakes. U.S. teachers kept error-related conversations private, rarely drawing attention to student mistakes during whole-class instruction. They also tended to be more positive, often beginning feedback with a compliment for effort. They were more likely to explain away errors, seeking out what was correct about what was said in an attempt to “soften the severity of the correction” (Santagata, 2004, p. 151). By comparison, Italian teachers had more abrasive responses to error and were direct about wanting students to take responsibility for their mistakes.

While relevant findings drawn from this limited set of the available cross-cultural studies are a good start, Bray (2011) provides an example of what is possible with focused attention to the fine-grained details of how teachers respond to error within the U.S. context. In her collective case study, Bray described the stark differences in the use of mistakes between four urban, third-grade mathematics teachers. In considering the four cases, Bray (2011) concluded that there were three key dimensions across which the teachers differed from each other: “the extent to which they intentionally incorporated students’ flawed solutions, addressed student errors in conceptually supportive ways, and mobilized students as a community of learners when errors were the focus” (p. 28).

However, despite its strengths, this particular study does not address whether and how the

results apply to teachers working across other content areas and/or in early childhood settings.

Chapter 3: Teacher Perspectives on Mistakes in the Classroom: An Interview Study

Teacher feedback about student mistakes is arguably one of the most crucial features of classroom discourse. Receiving corrective feedback about errors can help students refine their skills (Huesler & Metcalfe, 2012). However, because learners often appraise mistakes as threats to success, making mistakes tends to elicit negative emotions (Tomaka, Blascovich, Kibler, & Ernst, 1997). This can lead to discouragement about and/or avoidance of instructional tasks (Smiley & Dweck, 1994), both of which are counterproductive to learning. Before age five, children tend not to be afraid of failing; between ages 5-10 years old, attitudes and anxieties emerge related to making mistakes (McClelland, 1958; Conroy, Coatsworth, & Kaye, 2007). Because corrective feedback enhances student performance (Huesler & Metcalfe, 2012) and interpersonal interactions are at the heart of learning and teaching in the early childhood classroom (Pianta, 2006), the way that Kindergarten teachers respond to – and ideally leverage – mistakes can make a substantial difference in how students learn from their own errors.

Among practitioners, there is substantial disagreement as to the appropriate role of mistakes in learning. Many charter schools urge their teachers to “set and defend a high standard of correctness in [the] classroom” (Lemov, 2010, p. 35), refusing to accept student responses that are less than 100% correct (Lemov, 2010). On the other hand, teachers who work within the Montessori tradition are encouraged “not to make the child feel he has made a mistake” (Montessori, 1912, p. 75), instead offering students materials and protocols that facilitate independent, self-paced, and self-correcting learning experiences. Between these two extremes, a wide spectrum of more moderate

perspectives on mistakes and learning in early childhood have yet to be robustly explored and articulated in the research literature.

The current interview study helps to address a pronounced gap in the literature with respect to instructional practices educators use to address student errors, perspectives on mistake-making in early childhood classrooms, and the relational aspect of learning and teaching from mistakes. To build on prior laboratory studies and conceptual papers, this study will focus on reports of how teachers respond to student mistakes that occur during instruction in classrooms, as evidenced by teachers' accounts of instructional moves and student-teacher interpersonal interactions. Given how important mistakes are for learning, there is a clear need for a nuanced understanding of mistake-related classroom dynamics in American classrooms, particularly in the early grades when students' attitudes about school and learning are first being shaped. Exploring the strategies that Kindergarten teachers use to respond to mistakes will help to illuminate this ubiquitous yet difficult-to-study phenomenon, revealing perspectives that may be unique to teaching and learning in early childhood classrooms. To that end, this study will contribute to the literature on this topic by investigating the following research question: *What are some of the characteristics of Kindergarten teachers' attitudes, beliefs, and practices regarding how they respond to student mistakes in the classroom?* Within this broad question, the interviews probe several related sub-questions of interest:

- *What types of Kindergarten student mistakes do they encounter in their classrooms?*
- *What role do they believe mistakes play in the learning process?*
- *What strategies do they employ to help their students learn from mistakes?*

- *How do they address student misunderstandings and confusion?*
- *What factors do they consider when deciding how and when to respond to student mistakes?*

Methodology

Interview data were gathered and analyzed in order to identify a range of teacher perspectives about and experiences with student mistakes. Because “stories are a way of knowing” (Seidman, 2005, p. 7), the method of interviewing is an ideal means by which to collect teacher accounts of mistake-handling across several classrooms. As has been demonstrated in prior research (e.g., Santagata 2004; Schleppenbach et al, 2007), classroom observations are an important means by which to study teacher behaviors related to mistakes. However, the teachers’ “subjective understanding” of their choices is not directly observable; “interviewing allows us to put behavior in context and provides access to understanding their action” (Seidman, 2005, p. 10). During their interviews, the participating teachers provided a glimpse of their “interior experiences” with student mistakes, including “what they perceived and how they interpreted their perceptions” (Weiss, 1995, p. 1), as well as “the meaning they [made] of that experience” (Seidman, 2005, p. 9). The method of interviewing is a way to examine what Kindergarten teachers report that they do, say, and believe about their mistake-related teaching practices. This is a critical aspect of the study of Kindergarten teachers’ responses to student mistakes, as the teachers’ beliefs, perceptions, and interpretations can only be known by asking and listening to their stories.

In this investigation, 25 public school Kindergarten teachers were interviewed in order to 1) discover teachers’ self-reported beliefs, decision-making processes, and

explicit strategies for addressing student mistakes during instruction, and 2) compare across teacher interviews to identify common responses to student mistakes. Thematic analysis of interview data facilitated the development of general categories of responses to student mistakes and related attributes of classrooms.

Study Participants

The participants included public school teachers who worked as lead instructors in formal, Kindergarten classrooms located within a 15-mile radius of a large metropolitan city in the United States. Teachers worked either full-time or part-time for at least six of the twelve months prior to the interview session. Teachers' years of teaching experience ranged from 3-45 years, and 24 of the 25 teachers interviewed were female. The sample of teachers represented 14 different school districts, and no more than one teacher was included from any particular school so that a range of public school settings would be represented in the pool of participants.⁵

Figure 1. Means and ranges for attributes of the participating teachers and schools (n=25), 2014-2015 school year

Attribute of school/teacher	Mean	Median	Range
<i>Teachers' years of experience</i>	16.5 years	13 years	3-45 years
<i>Teachers' class size</i>	21 students	21 students	11-25 students
<i>School size</i>	460 students	430 students	250-800 students
<i>% of students eligible for FRPL⁶ in school</i>	36%	30%	5-85%
<i>% students of color (i.e., non-Caucasian) in school</i>	54%	48%	18-98%
<i>Grade levels in school</i>	• 19 Elementary School* only • 6 Elementary and Middle School		

Source: National Center for Education Statistics, 2014-2015 data

*Elementary schools included various ranges of grades in the school between PK-6 (e.g., PK-5, K-5, K-6)

⁵ Note: Public charter schools were excluded from the sample.

⁶ Free or Reduced Price Lunch

Figure 2. Attributes of the teachers' school districts (n=14), 2014-2015 school year

Attribute of district	
<i>Urbanicity</i>	• 17 teachers in 11 suburban districts • 8 teacher in 3 city districts
<i>Total number of students in district</i>	2,700-50,000 students in district (Mean: 10,000)

Source: National Center for Education Statistics, 2014-2015 data

Study Design

Recruitment. Names and e-mail addresses for potential participants were identified on publicly accessible school and district websites, and individualized invitations to participate in the study were sent out. Once a teacher replied affirmatively to the initial recruitment e-mail, the researcher followed up by e-mail to arrange a mutually agreeable time and location to conduct the interview. Of the 250 invitations that were e-mailed, 35 teachers replied with interest, and 25 completed the interview⁷.

Interview session. Each teacher was interviewed in a single session that was, on average, 40 minutes long, ranging from 30-105 minutes. Semi-structured interviews were conducted in May through August of two consecutive school years (2014 [n=6]; 2015 [n=19]), near the end of the academic school year and throughout the summer break. This timing was selected purposefully, so as to speak with teachers at a time of year in which they could reflect on the recently completed, year-long cycle of work with a single Kindergarten class of students. The interviews took place in a variety of settings that were convenient for the participating teachers, including classrooms or other meeting places at their schools, local public libraries, and coffee shops. An interview guide with

⁷ E-mail invitations were sent to all public school Kindergarten teachers who worked within the target geographic area and had contact information publicly available on their respective school website, without knowledge of their skill or reputation as teachers. A low yield of replies to the e-mail invitations was expected, given the fact public school teachers typically have substantial professional demands, and no compensation was provided to participants.

open-ended questions and potential elaboration probes was used to facilitate each privately-conducted interview session (Appendix A). The guide was developed and refined in a 2014 pilot interview study (Donaldson Gramling, 2015). There were four key sections to the interview protocol:

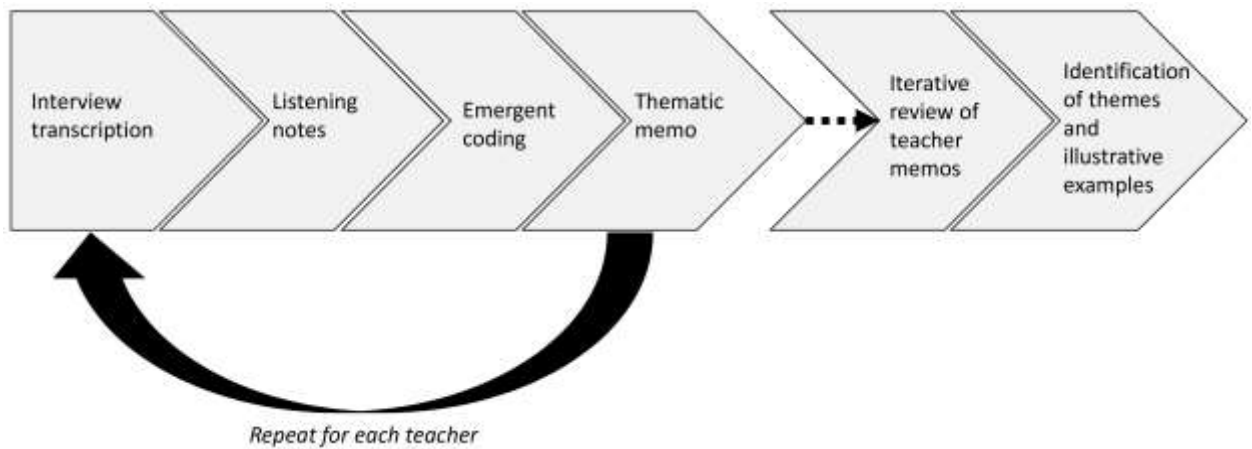
1. Classroom and instructional orientations (teaching background, descriptions of their classroom characteristics and teaching approach)
2. Definitions of error and statement of personal beliefs on mistakes in the classroom (attitudes about mistakes and strategies for response)
3. Recollections of responses to student mistakes (detailed descriptions of several experiences from classroom teaching)
4. Summative closing reflections (advice to new teachers, overarching philosophy)

During the interview, the protocol was closely referenced but adapted as needed, depending on the teacher's prior responses. The audio recordings of the interviews were later transcribed using a professional service.

Analytic Plan

Thematic analysis (Charmaz, 2006) was used to conduct qualitative, iterative, emergent (emic) coding of the interview transcripts. Analysis began with writing brief analytic memos (Miles & Huberman, 1994) after each interview in order to begin to identify, describe, and process potential themes related to the research questions, both within and across participant responses. A diagram outlining the full process of analyzing the interview transcriptions is presented in Figure 3.

Figure 3. Analytic process for data analysis



Prior to transcript review and coding, listening notes were completed – a practice of taking initial notes while listening continuously to the full interview recording (Dryden-Peterson, 2016). This was followed immediately by emergent, incident-by-incident coding (Charmaz, 2006) of the interview transcripts in the qualitative analysis computer program, MaxQDA11. This analytic approach was used as a means to unearth themes within the teacher’s interview responses. Examples of incidents that relate to the study’s key focus were descriptions of specific actions taken in response to student mistakes (e.g., clarify instructions), as well as general sentiments about mistakes (e.g., “It’s no big deal!”) and descriptions of general instructional practices and approaches (e.g., “I try to model making mistakes”). A description or adjective was applied as a label for each incident relevant to answering the study’s guiding research question. After the incident-by-incident coding of the first transcript, a memo was written describing the key emergent themes that stood out within that single teacher transcript as they related to the research questions, citing specific quotations from the interview as evidence and counterevidence of observations and interpretations (samples provided in Figure 4).

Figure 4. Selected samples of teacher quotes with corresponding codes and emergent themes

<i>Quotation</i>	<i>Emergent/open code</i>	<i>Within-teacher theme</i>	<i>Overarching, multi-teacher theme</i>
"My philosophy is I'm comparing them to themselves. Where were they? Where are they going? Where do we want them to be? We need a baseline. We need to compare."	Comparing students to their baseline to determine progress	Tailoring expectations for individual students	Individualize goals/support (Theme 1)
"There's just questions you haven't asked yet, and I want the kids to feel like they can ask anything."	Welcoming questions	Safety	Promote safe and relaxed environment (Theme 2)
"On their name tags, I put all the numbers one to 20, and so sometimes I'll be like, "Go back and check..."	Giving easily accessible tool	Prompting child to check/correct self	Self-correction prompted/encouraged (Theme 3)
"I would try a positive approach, try to look within myself; did I cause the error by misinformation or somehow not get the message across?"	Looking to self to understand source of error	Evaluating/reflecting on own teaching	Teacher takes responsibility; adjusts teaching (Theme 4)
"There's a little bit of pressure on teachers, I think, with Common Core and the State standards in keeping track of where kids are."	Feeling pressure from standards to track progress	Pressured from outside	Outside pressure to succeed (Theme 5)

This entire process was then repeated for each of the remaining interviews until there were 25 thematic memos reflecting the key themes from each teacher. After a close and iterative review of all 25 of the thematic memos, a comprehensive memo was written that included detailed descriptions of recurring themes that emerged repeatedly from across the teacher interviews as a unit.⁸ In addition to the memos, the original 2,575 emergent codes were referenced as the themes were articulated during the writing process, in order to assure that the conclusions drawn reflect the data set, and to search for counterevidence.

⁸ The interviews were analyzed as a single group of public school Kindergarten teachers. Due to the small sample size (n=25), comparisons were not made across subcategories of participant and school attributes (e.g., teachers' years of experience, urbanicity of school district).

Results

Teacher Definitions of the Terms *Error* and *Mistake*

What is an error? As might be expected, nearly half of the teachers defined the term *error* as “not doing it the right way,” getting an “incorrect answer,” and/or being “inaccurate.” This is congruent with the formal dictionary definition of the term: “Something that is not correct; a wrong action or statement” (M-W.com). Additionally, looking across the responses, the teachers seemed to conceive of errors in two main ways. In some cases, the answers students gave were perceived as clearly right or wrong, and in other instances, the teachers were more flexible and open to unexpected answers.

Some teachers described error as “black and white” because they felt that the term indicates that there is a single correct response. As one teacher elaborated, “This is the answer and if you don't meet that answer, then you've made an error.” Math was the most frequent academic context offered as an example, and one teacher remarked that errors are “pretty cut and dry in a math problem, but maybe not so much in a writing response.” Many teachers mentioned that errors can be the result of not following directions, rushing, carelessness, or simply misunderstanding.

Also, several teachers spoke about multiple, unexpected, or unconventional answers as being feasible and that those would not be counted as mistakes. They conceived of situations in which there are “really more outcomes than even adults think there can be” and “sometimes there's multiple answers.” For example, when answering a teacher's question about story details and a student offers a response that the teacher was not expecting, one teacher explained that “there's not a wrong answer” and acknowledged that “maybe we just both took in the story differently.” Other teachers explained that an

answer could “deviate from the accepted norm” or “veer” from a set expectation, and that this could stem from a difference in perspective or understanding, especially in subjects like language arts or social studies. One teacher went so far as to say that “greatness is out of the box. It's divergent thinking; it's making connections that are not conventional; it's creativity. It's the goal.” And finally, some teachers raised the point that mistakes are a jumping off point for learning opportunities. One explained that “there are no errors...there's places to start” and another said that as long as “there's growth, then it's not really an error because [in Kindergarten] they come not knowing anything.”

How do conceptions of the term *error* compare to those of the term *mistake*? The dictionary definition of the term *mistake* is “to understand (something or someone) incorrectly” (M-W.com). About a third of the teachers considered the terms *error* and *mistake* to be interchangeable. Another third explicitly mentioned that they do not use the term *error* in their Kindergarten classrooms, instead opting for the term *mistake*.⁹ The remaining third of teachers indicated some distinctions between the terms, explaining that most commonly, mistakes are “less negative,” less “harsh,” and more “gentle” than errors.

Common Types of Mistakes Made by Kindergarteners

Within the interviews, the teachers discussed three key categories of child mistakes that they observed within their classrooms: mistakes of execution, process mistakes, and behavioral or social infractions.

Mistakes of execution. Teachers described ways that mistakes students made revealed concepts and skills that they were still learning. These included reversals in

⁹ For the two, aforementioned reasons, the term *mistake* is employed throughout the balance of the chapter.

letter and number printing (e.g., backwards 7 or z), skipping numbers during counting (e.g., 11...12...13...15...), and invented spelling (e.g., “wuz” rather than “was”).

Teachers often noted that they viewed these mistakes as developmentally appropriate, and many remarked that paying attention to them was helpful in determining which interventions to provide to children.

Process mistakes. Teachers often mentioned that the Kindergarten students make mistakes when they get confused about directions or other information related to the execution of a task. For instance, a student might do a practice worksheet incorrectly because she does not understand how it is supposed to be completed. Students might forget to write their names on their work, or to put their homework folders in the collection box in the morning. Or, after being told directions for an activity, a child may simply say “I don’t know what to do.” Teachers most often viewed these mistakes as a part of teaching their students the processes of school. In addition to simply providing one-on-one assistance, many educators provided visual reminders, songs, or other cues to remind students of what to do to correct their mistakes for themselves.

Behavioral/social infractions. The Kindergarten teachers commonly described ways that students did not adhere to the norms of the classroom. They considered these mistakes in that clear expectations had been laid out and the student was pushing against established classroom norms and rules. The examples ranged from fairly benign (e.g., speaking out during a story reading without raising a hand and waiting to be called) to aggressive (e.g., pushing another child).

These three main mistake types appeared repeatedly in the interviews. They are drawn from teacher descriptions of responses to mistakes in varied contexts and in

response to direct inquiry about the types of mistakes they observed. The mistakes articulated here are the basis of the discussion of the main themes, further described below.

Overview of Themes in Teacher Responses to Kindergarteners' Mistakes

During the interviews, the teachers in the study shared a wide array of experiences and instructional practices tailored to their individual teaching contexts and to their students. Across the interviews, five strong themes emerged, evidenced by statements of prevailing attitudes about mistakes and learning:

Theme 1: *Students require differentiated responses to mistakes, which are determined based on who the child is and the context of the mistake.*

Theme 2: *Teachers build a positive, community-focused classroom culture in which children feel safe and encouraged to make mistakes.*

Theme 3: *Teachers extend support so that students are able to self-correct their own mistakes.*

Theme 4: *Teachers tend to respond to mistakes with adjustments to their instruction.*

Theme 5: *In addition to teachers and students, other people from outside of the classroom can have an important influence on responses to mistakes in the classroom.*

The following section consists of detailed elaborations of each theme in turn. Drawing on the content of the 25 teacher interviews, the themes reflect frequently-cited teacher beliefs and recollections of past experiences with students. The theme descriptions are accompanied by illustrative, representative examples from teacher interviews to support

the claims. The teachers who were quoted reflect common ways that the participating teachers said they enact these philosophies to improve student learning when mistakes occur in their classrooms.

Theme 1: Offer differentiated responses to mistakes. Several of the teachers acknowledged that the children in their classrooms require differentiated responses to mistakes. As one teacher put it, “Mistakes are on such a continuum for me with every student. What's a mistake for one kid is not a mistake for another kid. It's like a fantastic attempt for another kid.” The teachers discussed that students each have a variety of learning needs, and that children may need different responses from the teacher in order to learn from their mistakes. They also consider the context of response and/or the type of mistake when determining how to respond. That said, teachers consistently said that how they chose to respond to a mistake most heavily “depends on who it is” and can differ “based on the personality of the student.” The teachers often set individualized goals, tailored to each child, because, as one teacher put it, “Everybody gets what everybody needs in this class and all our needs are different.” An analogy used by another teacher further illustrates this common point: In the same way that “all flowers don't need the same water and the same sun... these guys don't all need the same things.” In short, there was a focus on understanding what each child needed in terms of support, interaction style, and challenge level, in order to help him or her learn best in the Kindergarten classroom. Taking all of these factors into account, the teachers said that “everything's case by case” when figuring out how best to respond.

Teachers also said that they attend to a variety of personal characteristics of the student when crafting their responses to student mistakes. The most commonly

mentioned characteristics were personality, temperament, and sensitivity/shyness. They consider “who's sensitive, [and] who's tough” in their class, and adjust their responses accordingly when mistakes are made. “Getting to know personalities of kids” is a pivotal part of being able to respond appropriately when mistakes happen. Teachers described that some students are more “fragile,” “sensitive,” “easily embarrassed,” or “quiet and shy and afraid to say something that might be wrong.” They found that these children, who were more afraid to show mistakes and more prone to melting down or crying about them, required “a lot more time, coaxing and hand-holding.” When responding to their mistakes, the teachers more often pulled them aside to discuss privately, or gave them time to calm down before addressing the mistake. By contrast, several teachers mentioned that some children were more open to feedback and “you can sort of push [them] a little bit more.” A few teachers noted that some kids “don’t care at all” about whether they’ve made mistakes and aren’t always “putting forth their best effort.” A teacher may decide to be a “little bit more firm” with these students. In these last two instances, a teacher may be prone to offer more direct feedback to children about their mistakes, for example, prompting the child to try again when a mistake is made publicly in front of classmates. In addition to these factors, some teachers also mentioned that they considered the student’s ability level (i.e., the degree to which he or she struggles with learning) and potential influences of the child’s home/family life on mood or attitudes. A few teachers also noted that children’s mistake-related attitudes, abilities, and interactions differ over time, with willingness to take risks growing over the course of the year.

Theme 2: Build a positive, community-focused classroom culture. Nearly all of the Kindergarten teachers interviewed reported that they actively worked to develop a

classroom culture in which mistakes are viewed positively. Some mentioned that they wanted it to feel like a “low-risk...and comforting environment” in which students would feel okay making mistakes. They “try to make it feel like it's a safe place to make a mistake,” and work to build a classroom community where kids “can trust that no one's gonna laugh at them if they make a mistake.” Expressed in one teacher’s words, teachers work to frame “mistakes as a positive rather than a negative ... not a failure” and to convey that “everybody makes mistakes, it is no big deal. And if you didn't make mistakes, you wouldn't need to be here.” In these ways, teachers normalize mistakes as an expected part of learning, while also presenting the act of making mistakes as a universal experience for all learners.

Attention to “mistake talk” in the classroom. To advance their goals to help build a positive culture about mistakes, the teachers talked with students in the classroom to support two general approaches: 1) build up students’ positive feelings about their capabilities and 2) avoid negativity about their mistakes.

Many of the Kindergarten teachers chose to first affirm what was done well in the child’s response, no matter what mistakes were made. One teacher suggested that teachers try not to be so “bogged down with getting the right answer, but look at the whole picture. Did they get something right? Did they get something out of the lesson? Did they have an ‘aha’ moment on something?” By focusing on “their strength, and then [the] next step,” the teachers create an opportunity to carry the mistake toward learning in a positive space.

The teachers also infused positive language into the discourse of mistakes, extending praise to build confidence and broad messages of positive talk related to

making mistakes. Many teachers emphasized the importance of helping Kindergarten students build their confidence and “know that they can do something.” One teacher mentioned that she tries “to validate what a student says rather than dismiss it,” again affirming that the contribution mattered, despite whether an answer was right or wrong. The teachers said that they looked for opportunities to praise students and constructed moments of success for them. When recollecting a time that a student made a mistake, one teacher admitted, in the end, that “I basically ended up giving him some success by matching up what he said with one of the letters on his page to make him feel good.” In this case with this particular student and set of circumstances, the teacher prioritized positive affect over pushing the child to execute the skill independently. Like her, others also prioritized helping the Kindergarten students to enjoy the new experience of school and to feel good about themselves. The teachers also felt it was very important for kids to be willing to try new things as they are learning: “You want to build them up, and you want them to feel like they're ready to take a risk to try something else.”

In their efforts to help students think more positively about mistakes, the teachers referred to a variety of positive messages and slogans that they recite in the classroom to encourage their students. “Everyone makes mistakes,” “Mistakes are fine,” “It’s okay,” and “No big deal” are just a few of the many different sayings teachers recited in order to convey basic ideas about what they hoped that the students would believe about making mistakes. They said these and other slogans to the students directly, often when a mistake had been made.

While focusing on positive framing, the teachers simultaneously worked to shield students from negative feelings about mistakes. Many teachers discussed actively

avoiding actions that would make their students feel ashamed, embarrassed, or singled out from peers when they made mistakes. Others also discussed working to keep things “light” about mistakes – laughing and making jokes with the children. Depending on the relationship with a particular child, when a mistake is made, the teacher might say to him or her “You’re so silly” or “Are you serious?,” turning it into “a big laughable moment.” Teachers emphasized that when joking about a mistake, “It’ll be humor and it’s not a judgment.” These types of playful interactions were only done with students who were not as sensitive and, from the teacher’s perspective, the interactions were “always positive.”

Convey clear, yet flexible, expectations. Several teachers commented that they expressed their expectations directly to students and model what is expected of them. “It’s extremely important to have simple, clear-cut goals” about what the child will be expected to do. In the classroom, “You’re here to learn, and you’re here to try,” and “I expect errors.” Many teachers mentioned that simply making an honest attempt at the task is the baseline expectation, frequently telling kids, “Try your best.” One teacher also described an example in which a child wrote the letters *H-R-T* as an expression of the word *heart*. The teacher felt that the attempt could be affirmed by simply telling the child, “I hear all those sounds in heart, too.” In this example, the expectation is not precision with adult or dictionary spelling, but instead, invented spelling that is developmentally appropriate for Kindergarten-aged students and applies prior knowledge of letter sounds. Based on the teacher’s framing of this account, it appears that the child met the teacher’s expectations by simply trying her best to apply the foundational skills she currently had. In the process, there is potential for the child to increase comfort with

writing attempts, despite whether or not she presented the word in the “grown-up way of spelling.”

Although clear expectations were an important element of classroom learning, this and other examples from several teachers illustrated ways that they tended to be flexible and open about the answers students gave. “All answers are accepted and whether it's right, or wrong, or we don't know, we can just try it out and then we can go from there.” Many teachers said that they prioritized trying and taking the risk over whether or not the specific answer was correct, and felt this was a means by which the Kindergarten class could learn. A positive and accepting attitude toward many different answers given by students meant that students could feel safe enough to put forward a wide array of answers, including those that are more unconventional. Several teachers stated that they enjoyed the results of this approach. For example, according to one teacher:

I've definitely had...projects where kids are just so creative and inventive. And, if they were to do the things that I'm asking them to do the way I'm asking them to do it, it wouldn't turn out half as good as it turns out when they explore and sort of do their own thing.

For most of the Kindergarten teachers, innovation was valued and encouraged, particularly if it was perceived as an indicator of engagement and risk-taking, which were seen as assets to the learning process. That said, there were some rare cases during which a couple of teachers described times at which having a precise answer was very important, for example, during interactive writing when the class is “writing together ...on a chart paper, [and] it needs to be correct.”

Teacher as model for responses to mistakes. Most of the teachers interviewed referenced that they make efforts to draw attention to their own mistakes when they occurred in the classroom. Some made a big deal when, in the flow of teaching, they have “failed at something that’s right in front of them,” with the students looking. Others said that they made mistakes on purpose as an instructional approach and a way of demonstrating for the kids that everyone, including the teacher, makes mistakes. “I really, really try to model making mistakes and show how to fix it and that nothing is the end of the world.” In this strategy, the teacher serves as a model of how to remain composed in the face of a public mistake in the future. Some teachers even mentioned that, when students make mistakes, they sometimes make connections to their own challenges with mistakes as a learner, perhaps even sharing “Yeah, that’s a really hard word, isn’t it? I used to have trouble with that,” or telling the students on the first day of school that “I’m the worst ‘forgetter’ [sic] in the world and so [you’re] gonna have to help me remember all these things.” In all of these cases, the teachers tried to model an adaptive response – expressing a positive or neutral affect when their mistake is made, asking the students for help to correct it, and assuring them that a mistake is no big deal.

Supporting peer interactions about student mistakes. As an extension of teacher modeling of mistakes, a large number of the Kindergarten teachers described offering support for peers to be able to help each other with mistakes. In their classrooms, the students know “we help each other,” checking each other’s work or giving guidance when someone is stuck. For example, one teacher said that in her class, “We talk about what it means to be a helpful partner, without giving answers.” This is a useful skill that is cultivated over the course of the school year. It means that each child can receive help

from someone other than the teacher, but still allows space for students to work for themselves. To that end, the kids serve as a resource to each other's learning from mistakes, helping others after they have gained mastery of a skill, thereby reinforcing it because "you learn best by teaching." As one teacher put it, with this approach, "It's not one teacher in the room: 19 kids, 19 teachers."

Theme 3: Promote and facilitate student self-correction. Teachers want to give students opportunities to self-correct and figure out answers for themselves. Broadly speaking, some teachers expressed that they "appreciate the kids' mistakes" as a means to encourage autonomy and independence, emphasizing that the children have responsibilities and that they should be "taking ownership of their own learning." Specifically, the teachers want students to take the time to self-correct because, as one teacher put it, "I've taught this, these are some resources you can use, and now it's your job to figure out how to fix this mistake." The teachers are there for support, but they want students to start to figure out how to do work through challenges and mistakes for themselves.

To promote self-correction, the teachers provide students with routines, strategies, and tools that are explicitly taught in order to help students to check and/or correct their work. The "self-checking strategies" provided by the teacher may be tools that students can use independently without teacher intervention, or standard processes that are rolled into classroom routines. This can include strategies like referring to a checklist in a writer's workshop folder, or looking to the word wall for proper spellings of sight words. Furthermore, teachers may remind students of these strategies when they hit a bump during an activity. For example, when helping a child read, a teacher may use "lots of

different pictures and charts to help them remember those strategies as we're working with them.”

Several teachers mentioned that they asked questions to help guide students through a self-check of their work. In doing so, they are able to lead a student toward ways to identify and/or correct the mistake. As an illustration, one teacher gave the example of how she would walk a student through an addition problem by simply asking questions:

‘Seven plus two, let's use a strategy. I want you to draw seven circles. Now I want you to draw two circles. How many circles do we have all together? What are you gonna write?’ And he would say the answer, ‘Nine.’ ‘Okay, let's write a nine. Now let's go down to the next one. Are you gonna write three on this? Do you think all of these are ... Is this all three? Yes?’ ‘No.’ ‘Okay, erase.’ And I'd let him do the erasing, ‘All right, let's go back.’

At other times, the questions were more open-ended and simply prompted the student to make his or her thinking more visible. Asking questions like “How do you think we can figure this out?” “Why do you think that?” or “Oops. Does that sound right?” prompt the students to double check their work and walk the teacher through their full thinking process. In these moments, the teachers maintained attention “on how they did it, so we ask them to tell us how you figured it out, and sometimes when kids are going through that, they'll come up with the wrong answer; and then when they go through it again and explain it to us, they get the correct answer.” The process of describing how to find the answer can serve as a fruitful exercise to help students figure out what went wrong in a prior response and correct it in real-time, often without prompting from the teacher.

Sometimes, as an alternative to questions, teachers simply give a hint in the form of a statement like “I’m looking at this sentence and I’m noticing it needs something.”

Whether addressed in one-on-one interactions or in front of the class, either case represents an invitation for the student to revisit the work and talk through it with the teacher. The learning experience is scaffolded to the extent needed, but the teacher tries to let the kid do it for himself or herself without directly being given the answer.

It is important to note that, although most teachers shied away from giving students answers and instead tended to promote self-corrections, a large number of them acknowledged that there are moments in which it is best to simply tell the student the right answer.

Even with some of that questioning and probing and trying again they may not get there, and depending on what it is that you're talking about, they may need to just be told that this is the way it is. And it may be something that they're not ready for.

Teachers commonly reported that a step like this came after attempts to prompt self-correction.

Theme 4: Respond to mistakes with adjustments to instruction.

Evaluating own teaching. Nearly two-thirds of the Kindergarten teachers described various ways that they evaluate their own teaching and take responsibility for the students’ mistakes. One central piece to this is that, when students made mistakes, teachers often first considered flaws in their own teaching that might have led to the misunderstanding:

When you're looking at mistakes, before you think about them as a 'child's mistake,' think about what you're doing that might be contributing to the child making that error ... because you can probably reflect back on a different way you might have taught that student, or one more thing you could've done, that would've made it easier for them to understand.

In response to student mistakes, the teachers often took time to consider the specifics of what they did during instruction. "I have to look at my approach, where did I go wrong? What's my part in this? ... I have to assess myself. Was I not ready? Were they not ready?" Numerous teachers expressed that it was not primarily the children's responsibility if mistakes were made; instead they felt that "If they're making mistakes, then I'm making mistakes." If students were trying their hardest and were not able to do what was asked of them, many teachers felt that they, rather than the children, should bear the blame. Therefore, teachers said that they felt it was up to them to come up with alternative explanations and approaches to remedy the student's misunderstanding.

In the process of trying to interpret why students were not getting it, teachers said they looked closely at student work and/or the mistakes made in order to diagnose the root cause of misunderstanding. Teachers collected and used data to inform their understanding of and responses to student mistakes. This includes administering formal assessments, as well as simply circulating throughout the room, attending closely to student work in progress. In these ways, the teachers take time to "tailor it more to what his needs were and sort of tease out why that was occurring, and help work on strategies to help him sort of figure out what to do."

Additionally, as part of taking responsibility for the mistake that was made, the teachers shared that they adjust their teaching in order to address the student mistakes. Sometimes it is as simple as clarifying or restating the directions if the students were not paying attention, were rushing, or did not understand what was asked of them. At other times, it involves thinking of different teaching strategies to express a new concept or skill – “sometimes they just need something explained a little bit of a different way.” Another approach shared commonly was to simplify or narrow the task, or to change the structure or pace of the curriculum. “If it's really evident immediately that what I'm asking the student to do is too difficult, then one response would be to quickly try to modify it, and take something away that would make it more understandable or make it easy.” It stands to reason that these approaches both acknowledge that teachers view it as their job to be responsive to the children’s needs and abilities, and to set up situations in which the kids can actually complete the tasks asked of them.

One-on-one discussion. Nearly all of the teachers discussed that, at times, it was necessary to “pull” kids aside to provide opportunities for practice, feedback, and/or intervention one-on-one, in a private setting. There was an emphasis on creating a space so that “not all the kids knew you were pulling [the child] aside,” and teachers did not typically “allow there to be an audience” to those conversations. The focus was first on calming the child down, if necessary, and then on offering a more detailed look at “which part is getting tricky.” The focus on keeping the discussion private meant that it did not take time away from the broader work time for students who already understood the concept, and at the same time did not embarrass the student. On the other hand, this is just one of several strategies that the teachers said they used. For example, at other times,

depending on the student involved, some teachers said that they might choose to draw attention to a mistake publicly with the whole class. When this approach was taken, it would be done in a “well-thought out way.” It may be done to address a misbehavior so that the public exposure will “jar kids into reality” or “if it's an error about something that everyone could learn from.” A few teachers remarked that they consistently respond to mistakes in the same way, whether in public or private.

Additional approaches: Repeating instructions and taking a break. Teachers also mentioned repeating the directions for the task and having the student take a break as two additional approaches they used with students. Many of them described a time when they would repeat or reword the expectation or directions if a student made a mistake. “Half your day is mistakes, and reshaping or redirecting or, ‘Well, let's try this again.’” This is something that they said they expected as Kindergarten teachers. One teacher felt that, when mistakes happen in classrooms, “More of the teachers have to say, ‘Remember, this is what was expected today.’”

A large proportion of the teachers also made mention of urging a student to take a break when a mistake is made in order to “take the pressure off.” This was most commonly in the context of the student having a negative emotional response. While sharing about a student who was very upset about making a mistake in her work, one teacher said that “We had to completely redirect her. Like, no more of this lesson, we are moving on ... to like, you need to go have some quiet reading time and just focus on something else.” In cases like these, teachers would loop back later on, after emotions had calmed, in order to help the child to complete the work or to be taught the lesson. Another case in which this might happen is if the work is deemed to be too challenging.

In addition to adapting the work if the assignment “wasn’t happening,” the teacher might save the more challenging part for later. When a couple of students were not understanding an assignment on vowels, one teacher simply said, “Just try your best...You're just gonna focus on the short vowel then. Don't even worry about the long. We'll do that tomorrow.” By saving it for later, the teacher created a more doable chunk of work for the student, so she could reach the goal for the day, and also signaled that she could take a break from the harder part until a later time.

Theme 5: Consider outside factors that impact learning from mistakes in the classroom. *Respond to demands of school leadership and/or district.* Many teachers expressed that, as compared to the past, administrators and/or districts more frequently prioritized Kindergarten student performance and assessment, or asked them to use more academically-rigorous curriculum. Teachers who brought this up generally felt that “There's a lot of pressure for us to do academics [in] Kindergarten” and, with that, “It's not fun, like it used to be.” In discussing pretests, one teacher described a math assessment, noting that “If you're asking a student an addition problem and the student doesn't know what the number five is, then what are you doing to their self-confidence right off the bat and teaching them about how they're already not succeeding in school?” As another teacher described a curriculum that was mandatory in her district, she said she felt that, looking at how the lessons were paced and designed, “It's like they want them to fail. There is not really any mastery in any level, on any grade. You know, you are exposing them. You're moving on, you're exposing.” And other teachers mentioned that they disagreed with the pressures “for getting things right and doing so much better than previous generations, which Kindergarteners can’t really do.” As a result, this teacher felt

that the pressures to get students to achieve force her “to deal with errors in a different way than 10 years ago people might've dealt with them.” This and other teachers felt that what was being asked of them was beyond the developmental capabilities of 4-6 year olds, and clashed with their own training and beliefs about how their young students learn. “I don't necessarily philosophically believe that Kindergartens should be having so much direct instruction in reading. I feel like they...will learn to read by being in the environment and being exposed to it. At the same time, there's this pressure.”

Weigh home/family influences. Many of the teachers mentioned ways that parent expectations influenced students in the classroom. In particular, if children were resistant to making mistakes in the classroom, it could be because of pressures from their parents. “I try and think like if a kid is really sensitive about falling apart 'cause they make a mistake, are they getting a lot of grief at home? ...You gotta think of the whole picture.” Some teachers did mention that it could simply be the personality of the child, so it is difficult to discern precisely where the children’s sensitivities come from. Another connection with the school was to share information with parents about their child’s mistakes and ask them to practice at home to help the student improve and learn. Some teachers view parents as a resource, and one described “tapping into them as partners in learning.” Others mentioned, particularly for kids who come from advantaged backgrounds, contacting the parent to call out student attitudes toward learning. “I might be calling your mother. Your kid’s not trying in school...I send home papers all the time that will say, ‘Incomplete classwork, please do at home.’ They don’t like those notes.”

Discussion and Implications

This study has illuminated some of the thoughts, attitudes, and responses that the participating Kindergarten teachers have to their students' mistakes in the classroom. This in-depth, interview analysis has yielded detailed descriptions of a few of the ways that teachers leverage mistakes during instruction, work to help students feel comfortable taking intellectual risks, and consider mistakes in light of the contexts in which they and their students operate.

The study features an important part of the “black box of teaching” (Black & Wiliam, 2010), outlining some of the nuts and bolts of how teachers teach as it relates to mistakes. The results of this study make it clear that the craft of building a classroom culture that is mistake-friendly and that addresses learners as individuals requires both skill and effort. While some of the central themes may be relevant to many teaching contexts, there are some issues that seem as if they may be specific to the Kindergarten context – in particular, the teacher's attention to developmentally appropriate mistakes that kids make as they learn foundational skills in early childhood; for example, typical letter printing errors (Graham, Weintraub, & Berninger, 2001) and invented spelling (Chomsky, 1976). As the teachers brought up their awareness of common mistakes that Kindergarteners make and the spectrum of responses they have to students, this study also affirms the findings of Bray (2011), illustrating ways that the teachers' content-specific knowledge and mistake-handling expertise are both needed to best help students learn from mistakes.

These findings corroborate some of the insights from prior studies that, by international comparison, identify U.S. teachers as being careful in their responses to

mistakes – mitigating them so as to protect students’ egos, taking on the blame for their students’ mistakes, and seeking to address them privately (Santagata, 2004). The teachers in the study shared that they attend to the emotional aspects of learning (Immordino-Yang & Damasio, 2007) and work to build a classroom culture in which mistakes are used as positive experiences for students (Steuer, Rosentritt-Brunn, & Dresel, 2013). In doing so, the teachers express a desire to help their students to broaden the actions they are willing to make (Frederickson, 2001) during classroom activities. Furthermore, when they direct students to focus on putting forth their best effort, the teachers promote a growth mindset, which is “the belief that your basic qualities are things you can cultivate through your efforts” and that, despite initial differences in skills, “everyone can change and grow through application and experience” (Dweck, 2009, p. 7). As the teachers frame mistakes as “no big deal,” they work to minimize the association of negative emotions with mistakes and encourage student attempts to try again. This promotes students’ intellectual risk-taking and can help them to persevere as they practice new skills, despite mistakes and failures. In this sense, these study findings complexify some of the results from prior studies, which found U.S. teachers not as willing to focus or dwell on mistakes in class (Schleppenbach, et al., 2007). By contrast, the teachers in this interview study seem to devote a great deal of time and attention to mistakes. Rather than universally avoiding public discussion of mistakes, the decision to attend to the mistakes publicly or privately depends on an array of factors. This point is one of the ways the study extends the current literature – it articulates several components of a broad toolkit of mistake responses that are applied in the classroom, and considers how, why, and when teachers select various approaches. Also, the study illustrates some of the concrete ways that the

relational and interpersonal aspects of classrooms are considered, a vastly understudied part of teaching and instruction (McDonald, Bowman, & Brayko, 2013).

This study is meant to broaden our understanding of the nuanced ways teachers respond to mistakes. As stated above, there are many insights about mistakes and learning that can be drawn from this work. That said, while this is a richly detailed glimpse into this aspect of teaching and learning, there are some limitations to the study worth stating. Because interviews are comprised entirely of self-report, it is inevitable that the teachers were not completely objective and accurate in their reflections. This could include posturing to present themselves in the best possible light, wanting to please the researcher, or even just accidental omissions of fact. Teacher reflections may tend toward the most salient and/or most recent experiences from their classrooms, and some interviewees may find it difficult to recollect the most mundane responses to mistakes. It is also feasible that, during self-reporting, teachers may overestimate or underestimate the extent to which they apply their stated beliefs during day-to-day, classroom practice. Furthermore, because the interview questions are metacognitive in nature (e.g., If you need to address a student error in class, what do you think are the best ways to do so?), the thought-exercise could also have prompted some teachers to make post-interview adaptations to their mistake-related instructional practices. Additionally, it is worth stating that this is a small, self-selected sample of participants who elected to be interviewed, and their collective and individual sentiments are not representative of any particular group beyond themselves. This means that teachers who chose not to participate may have different approaches to mistakes, or may work within alternative classroom environments than those included in the study.

Despite its limitations, this study offers a means to consider classroom practice in ways that advance our current knowledge about learning from mistakes, while also informing instructional practice. The findings raise questions about when and how teacher responses to mistakes vary. Among the teachers in the study, it is possible that there may be particular contextual factors, levels of school academic resources and/or pressures, teaching styles, and student characteristics that shape how teachers view mistakes. While these questions are beyond the scope of the current analysis, pursuing these ideas in future work will help continue to expand our understanding of mistakes and their relevance for classroom learning and teaching. Future research on this topic can branch off into several directions. For example, later studies can draw on the key themes from the teachers to design and test observation checklists and/or survey instruments that can reliably and accurately capture teachers' thinking and practices related to mistakes and learning. Using these methods would allow for systematic and consistent measurement of differences across a wide range of educational contexts. Subsequent interview studies can investigate the work of educators who work in contexts other than the public school Kindergarten classroom. Although not addressed in this small study, speaking with teachers who serve students at different grade levels, who have varied levels of experience, who teach in alternative school types (i.e., private/independent, charter) or within particular content areas, who live and work in diverse geographic regions or levels of urbanicity, and/or who teach students of varied characteristics (e.g., socioeconomic status, race, ability level) may reveal variations about beliefs and practices related to learning and teaching from mistakes. And, importantly, future work should directly investigate learners' beliefs and attitudes about mistakes. Traditional

surveys – particularly with young students – that are text-heavy or that may present lexically-complex questions may not be valid measures of their thoughts and feeling about making mistakes. Close observation, evaluation of student drawings and writings, and photo-elicitation interviews can serve as a means to explore young children's thinking about mistakes. Findings on children's thinking could also be juxtaposed with the sentiments of their teachers in order to more fully represent both sides of the teacher-student mistake interactions in early childhood classrooms. Altogether, the present study and future studies offer a novel strand of practice-relevant research that can help improve the degree to which teachers can respond to student mistakes and promote a positive mistake-culture in their classrooms.

Chapter 4: Portraits of Teachers' Responses to Mistakes in Context

The prior chapter was a detailed exploration of Kindergarten teachers' perspectives on mistakes that occur during classroom learning. The participating teachers described beliefs about the importance of differentiating responses to mistakes based on student needs; detailed strategies they used to promote student self-correction; explained how they strive to build a positive and emotionally-safe environment for risk-taking; offered ways they adjusted their pedagogical practice in response to student mistakes; and noted the influence of outside factors on mistakes in the classroom. The insights from Chapter 3 expand our current understanding of the mistake-related practices and ideals of Kindergarten teachers. Listening to teachers' stories, perspectives, and reflections on their professional practice is a critical first step in exploring this topic, and the teachers' reports of their own experiences undoubtedly help open a window into how they think about and respond to mistakes. At the same time, the interview study spawns additional questions about the day-to-day instructional choices teachers make when faced with student mistakes. It is important to note that many of the exchanges about mistakes described by the teachers in the interview study relate to quite ordinary processes of teaching and learning, are brief interactions that last only a few moments, and happen with different children in the class throughout the day. With this in mind, it is important to pair the broader insights from the interview study with a closer look at what happens in real-time. Observing the classroom as mistakes unfold affords the opportunity to document the action of common responses over an extended period of time, and to juxtapose the observations with teachers' stated intentions and interpretations.

In this chapter, I use the method of portraiture to answer the second central research question of my dissertation: *Looking closely at two Kindergarten teachers, what is the nature of daily teacher-student interactions regarding mistakes?* While employing this phenomenological approach, I attend closely to the teachers' and students' lived experiences of mistakes, specifically attending to these sub-questions:

- *How do the teachers respond to student mistakes?*
- *How do the students respond to their own mistakes and to the teachers' responses to their mistakes?*

Methodology

Portraiture is a qualitative method that allows researchers to triangulate rich data in order to create artistically-rendered accounts of people, communities, concepts, and more (Lawrence-Lightfoot, personal communication, 2012). In this portraiture study, I have gathered data from a variety of sources and used it to write vivid representations of two individual Kindergarten teachers responding to student mistakes in real-time, situated within their respective class communities.

As a portraitist, my focus is on *goodness*. My work is driven by the assumption that there are always positive lessons to be learned from the participants in the portrait (Lawrence-Lightfoot & Hoffman Davis, 1997). Rather than pinpointing what was wrong or dysfunctional in the classrooms, my goal was to investigate “What is happening here, what is working, and why?” (Lawrence-Lightfoot & Davis, 1997, p. 141-142). I took on the “generous *and* critical” portraitist’s stance (Lawrence-Lightfoot & Hoffman Davis, 1997, p. 143) and strove to portray the stories of classroom mistakes in a manner that is

not overly idealized nor harshly judgmental. This is a particularly effective approach for the topic of student mistakes, which are helpful to learning (Huesler & Metcalfe, 2012), but generally laden with cultural meaning and viewed as something to eliminate or avoid (Bray, 2011). A focus on goodness reframes mistakes in the classroom – which are often perceived as faults or manifestations of weakness – as social and cultural experiences that reflect a wide range of qualities that have yet to be revealed (Lawrence-Lightfoot & Hoffman Davis, 1997).

Lawrence-Lightfoot (1983) and other scholars (e.g., Cambone, 1990; Noonan, 2014) have used the method of portraiture to represent the complexity of school environments. By entering the classrooms with an open stance that does not seek to confirm specific, pre-determined hypotheses, I allowed space for emic theories and meanings to emerge from the data I collected. Developing portraits of teachers has allowed me to closely attend to the frequent moments of mistake-making in Kindergarten classrooms. These moments are unique to their environments, yet are likely to feel familiar to most people, thereby representing the “universal in the particular” (Lawrence-Lightfoot & Davis, 1997, p. 14-15). Additionally, this methodological approach removes the discipline-specific jargon and formality that often characterize the final product of traditional academic writing. In this and other studies, the use of portraiture can help to make findings accessible and relatable to a broader audience of readers, including teachers, school leaders, policymakers, and families.

Study Participants

From the sample in the interview study, two public school Kindergarten teachers were recruited to participate in the portraiture study. Teachers were invited on the basis

of three criteria: 1) five or more years of teaching experience, 2) taught in a public school district, and 3) expressed interest and enthusiasm in the topic during the initial interview, and a willingness to allow future classroom observations.

Figure 5. Attributes of the participating teachers and schools (n=25)¹⁰

Attributes of school/teacher	Mr. Allen (Portrait 1)	Mrs. Tucker (Portrait 2)
<i>Teacher's years of experience</i>	9 years	25 years
<i>Class size</i>	23 students	21 students
<i>School urbanicity</i>	In city district	In suburban district
<i>% of students eligible for FRPL¹¹ in school</i>	>70%	<10%
<i>% students of color (i.e., non-Caucasian) in school</i>	>90%	<25%

Sources: Teacher interview transcripts, National Center for Education Statistics, 2014-2015 data

As represented in Figure 5, the teachers worked in distinctly different school settings that varied in urbanicity of location and in student body characteristics (i.e., socioeconomic status, race). Additionally, it is worth noting that Mr. Allen's school was larger, with 40% more students than Mrs. Tucker's school.

Data Collection

Classroom observations. In each classroom, instruction-related activities were observed over the course of about six weeks, totaling roughly 70 hours in each classroom. Whole-class, small-group, and one-on-one instruction were closely observed, and were video- and audio-recorded. This allowed for later review of critical moments of teacher-student interactions and access to precise quotations, as needed.

Initial fieldnotes were collected while observing classroom instruction, capturing factual and objective "thin" descriptive data (Geertz, 1973) that reflected what was observed, without interpretation. The contents included timestamped and paraphrased

¹⁰ Approximations were provided for some attributes in order to ensure the anonymity of the school site and the participating teacher.

¹¹ Free or Reduced Price Lunch

quotations from mistake-related occurrences, as well as descriptions of the sequence of classroom events, settings (e.g., the furniture arrangement, room lighting, and items on a desk), and people (e.g., clothing, demeanor, and age). With the help of the video and audio recordings, these notes were later expanded to include additional “thin” details from the instances during which mistakes happened in the class sessions. Distinct from the fieldnotes, Impressionistic Records were composed for each day of observation. These memos included developing thoughts and reflections on data interpretation, emerging hypotheses, notes on surprising and/or puzzling occurrences, and ideas for further explorations during the next foray into the classroom (Lawrence-Lightfoot & Hoffman Davis, 1997, p. 188).

Teacher interviews. Each teacher was interviewed at several points over the course of the extended observation period. In addition to the transcript from the interview study, two additional 20-30 minute interviews were interspersed throughout the weeks in the classroom, and a final 60-90 minute exit interview was conducted at the end of data collection. All interviews were later audio-recorded and transcribed. Interview questions were developed based on emergent themes from Impressionistic Records, and teachers were invited to respond to selected video clips and/or transcript segments from their own classrooms. Additionally, on an ad hoc basis, there were frequent 1-10 minute check-in conversations in immediate response to particular observed events in each classroom relevant to the research question.

Other data sources. In addition to observation and interviewing, supplementary sources of data were gathered as opportunities arose. The most common source was

artifacts from student work and/or class activities, which were digitally photographed and archived along with audio and video files for later analysis.

Analytic Plan

For this study, I adopted the stance of a portraitist, listening for emergent themes from the people and in the environments in which I was immersed. I did so by employing five key modes of synthesis, convergence, and contrast: repetitive refrains, resonant metaphors, cultural and institutional rituals, triangulation, and contrasting and dissonant perspectives (Lawrence-Lightfoot & Hoffman Davis, 1997, p. 193). As in the emic coding of the interview data, I took a grounded-theory approach to this phase of data analysis (Glaser & Strauss, 1967; Charmaz, 2006), using the above modes to generate theories from the data themselves. While I allowed the theories from the prior literature and preliminary insights from the interview study to help focus my observations, I continually developed, elaborated and modified these theories throughout the process of data collection (Strauss & Corbin, 1994, p. 273). Rather than seeking confirmation of pre-determined hypotheses, I identified themes that naturally emerged from the iterative review of fieldnotes, interview transcripts, Impressionistic Records, and other data sources. I tested emerging theories through triangulation of findings across instances and data sources and, as needed, elected to pursue additional data collection in response to prior observations. At all times, I strove to maintain an open mind and an eye toward what was working well (*goodness*) in each class community that I observed.

An important part of the method of portraiture is the narrative rendering of data. In my own unique voice, I have told the story of each teacher and his/her students, featuring the role that student mistakes played in each learning community. In order to

craft the aesthetic whole of the portrait (Lawrence-Lightfoot & Hoffman Davis, 1997), I first went through an iterative process of reviewing the data, revisiting ideas noted in the Impressionistic Records, and organizing the ideas in a generic outline that included emergent themes and corresponding evidence. Once I had a sense of the overarching vision of how to frame the piece, I developed subthemes that serve as structural “girders,” marked by subheadings in the narrative. Next, I assembled stories drawn from the data that provide evidence of the themes and breathe life into the narrative. And finally, I ensured that the portrait had narrative coherence, as demonstrated by a logical sequence of story events and “repetitions of images, patterns, and refrains” throughout the piece (Lawrence-Lightfoot & Hoffman Davis, 1997, p. 256).

Potential Threats to Validity

While an enormous volume of fieldnotes and data were collected, because they reflect the narratives of just two teachers, the portraits are necessarily idiosyncratic to the participants and their particular contexts. The goal of this study was not broad generalizability, but rather, nuanced, deep understanding of classroom activities and interactions related to various instances of Kindergarteners’ mistakes.

As a portraitist, my goal was not simply to be a silent and passive observer or “fly on the wall,” but to engage with the individuals and the community in which I was immersed. Faced with a wealth of data as I crafted the aesthetic whole of the portrait, I made decisions about which stories to tell, and from which perspectives to tell them. In taking on a portraitist’s stance, this study was “deeply empirical, grounded in systematically collected data, skeptical questioning (of self and actors), and rigorous examination of biases – always open to disconfirming evidence” (Lawrence-Lightfoot &

Hoffman Davis, 1997, p. 85). Accordingly, by focusing on the collection of factual, “thin” descriptive data (Geertz, 1973), by triangulating the teacher interviews with observational data and other classroom learning artifacts, by pursuing constant reflexivity during data collection and analysis, and by distinguishing my interpretations from the empirical data during the writing of the portrait, I have worked to be honest and forthcoming concerning many of these limitations, in a way that is transparent to readers.

Portrait 1

Mr. Allen: Transforming Mistakes into Melodies

Mr. Allen's class meeting always starts with a song.

"Good morning...everyone!"

Good morning...we're happy...we're here!"

It is January and by this point, midway through the school year, Mr. Allen has clearly established that this tune signals the beginning of their daily class meeting. When he starts a cappella in his loud and strong tenor voice, the students quickly join him in chorus. He sings the short, peppy jingle with a tone of enthusiasm, matched by his bright, brown eyes and a full, genuine, and friendly smile. Mr. Allen is a Caucasian man of medium height; his brown, wavy hair is cut short and swept to the side. Today, he is wearing a long-sleeved striped sweater with alternating black, brown, orange, and cream-colored horizontal stripes, paired with khaki pants and black dress shoes. At the front of his class, he looks both professional and comfortable as he starts the work of the day.

The students are seated "criss-cross banana sauce" in their assigned spots on the rug in the class library. Looking across the room, I see little faces of every shade of brown, and hair of every color, length, and texture. Each child occupies one of the brightly-colored squares delineated by perpendicular lines on the rug. Once the short song ends, Mr. Allen begins the class' routine series of daily check-ins and songs.

"What's wrong with the calendar?"

All across the area rug in the library, many small hands shoot up into the air. With a pensive look on his face, his eyes scan the room. "Angelo," he calls.

“You have to change it to the 27th,” Angelo replies.

“To the 27th,” echoes Mr. Allen. With that, he stands, carefully steps the short distance from his chair over to the calendar, and moves the clip to the proper spot.

“Who knows what day of the week it is?” He calls on Scott.

“Uuuuum. Wednesday”

“Today is IS Wednesday,” echoes Mr. Allen. “What WAS yesterday, Arthur?”

“Tuesday,” Arthur quickly replies.

“And if yesterday WAS Tuesday,” Mr. Allen continues, “and today IS Wednesday, what day WILL tomorrow be, Carrie?”

“Thursday,” she responds. As each of the three students offers a reply to his questions, he captures their responses on a printed sign atop the whiteboard at the front of the class for all to see.

After Carrie’s answer, the chart is fully updated and Mr. Allen immediately breaks into song. “*Days of the week*” ...click click. “*Days of the week*” ...click click. “*Days of the week, days of the week, days of the week*” ...click click.

To the tune of “The Addams Family,” the students collectively sing and click their tongues along with him. As they sing the verse of the song, Mr. Allen stands next to the calendar and points to each day name, in turn.

“*There’s Sunday then there’s Monday. There’s Tuesday then there’s Wednesday. There’s Thursday then there’s Friday. And then there’s Saturday. Days of the week*” ...click click. “*Days of the week*” ...click click “*Days of the week, days of the week, days of the week*” ...click click.

As they finish that song, without pause, the class immediately breaks into “Happy Days,” the next tune in their sequence.

“Sunday, Monday happy days! Tuesday, Wednesday happy days! Thursday, Friday happy days! Saturday. What a day! Groovin’ all week with you...”

The children sing and do hand motions throughout the song. When it ends, Mr. Allen clasps his hands together and sings the question, “*What is today’s date?*” – repeating a single note in an energetic and comically dramatic tone. With his hands in his pockets, he sings, in that same single note, “*Kameron, I love your school listening look. You’re making me very proud of you and I love how you’re always trying your best!*” As he finishes his brief serenade, Mr. Allen raises his left hand, swinging his open palm toward the calendar, inviting Kameron to offer the full date aloud to the class.

The room is silent. Kameron is turned toward Mr. Allen and leaning forward on his hands from his spot on the rug, placed just behind his twin brother, Kevin. Today, as every day, the two boys completely match each other, donning identical, red, collared shirts, their black, straight, shiny hair styled in trendy, new, short-angled bob haircuts. Kameron rocks as he replies, shifting the weight of his body backward and forward onto his hands. As he moves in the silence, Kameron states each part of the date a moment or two after Mr. Allen points at the placement of each answer on the calendar. “Wednesday. January. 27. 2016.” Kameron takes his time and, with Mr. Allen’s non-verbal help pointing to the class calendar, he correctly states the day of the week, month, date, and year.

“Nice work, Kameron.” Mr. Allen applauds his success, rapidly clapping his hands together five times. “You were thinking really hard. Carrie!”

Carrie takes her turn and, again, Mr. Allen points to each place on the calendar as she speaks. In a mild voice, she quickly says her response. “Today is Wednesday, January 27, 2016.”

Mr. Allen’s eyes widen slightly and he does a quick nod of his head. “Carrie, you are getting faster and faster at that. Olivia, wanna give it a go?” As he did for the other students, he stretches his hand out toward the calendar, resting his pointer finger on the word *Wednesday* on the chart. He stands there, smiling and pointing, waiting for her response.

After a brief pause, Olivia admits, “I don’t remember.”

“So, let’s say it,” offers Mr. Allen immediately. “If we forget what day of the week it is, we start at the beginning. So, what is this one?” He points to the word *Sunday* on the classroom calendar. “It’s always...”

With this open-ended invitation, Olivia speaks up, reciting each word as Mr. Allen points to it on the chart. “Sunday, Monday, Tuesday...” She pauses for a quick second. “...Wednesday!” Olivia stops and looks up at Mr. Allen.

“Wednesday,” he echoes back, affirming the answer she has reached using his strategy. In acknowledgment of her making this connection, he extends one arm toward the correct answer on the calendar, and reaches the other toward little Olivia, who has just provided the word.

He moves on, pointing to the month at the top of the calendar. Olivia immediately says “January.” He points to the 27. “7,” she says, making an attempt to read the day of the month he is pointing at.

“27,” he says in a pleasant voice and with a single nod of the head.

“27,” she echoes. He points to the year card with 2016 printed on it, and Olivia says, “2015.”

His face brightens with a smile and he raises his eyebrows. “Sixteen. Remember it changed this month,” he says lightheartedly.

“No!” She smiles as she declares playfully and in a strong voice, “I want it to still be 2015!”

Mr. Allen jests, “But then we’ll have to call the birthday police to keep you five forever, Olivia. And you won’t be able to turn six!”

From the back of the room, another student chimes in, “And I won’t be able to turn seven!”

“Oh, my goodness.” Mr. Allen shakes his head, furrows his brow, and declares, “And then where would we be?” After a beat of silence to ponder that possibility, Mr. Allen relaxes his face and continues the meeting. “And everyone, let’s say in a nice voice, today is....” As Mr. Allen points to each part of the calendar, the class recites the date altogether, in a resounding chorus: “Wednesday, January 27, 2016.”

In these exchanges, I sense a level of ease and comfort between Mr. Allen and the students, particularly Olivia, who jokes back with him after making three mistakes in front of the class. The interaction with her about her mistake in identifying the date illustrates the general approach Mr. Allen takes to instruction in his classroom. In small and large group settings, he gives many different children opportunities to try – and to shine. He scaffolds learning so that students can avoid mistakes, proactively drawing attention to where they can find the right answer (when there is one). He also thoroughly encourages them when they do make mistakes, and praises them when they succeed. In

his praise, he highlights Kameron's effort level, and Carrie's improvement over time. And when Olivia isn't able to put together the answer on her own, he talks her through concrete strategies that can help her use the calendar in front of her to find the right answer for herself.

Strum What You've Got: Striving to Make the Most of the Less than Ideal

Shaun Allen has taught Kindergarten at Prince Elementary for the past nine years. He started at the school with a newly-minted college degree in Early Childhood Education and several teaching certifications. In his self-described "traditional Kindergarten," he works with 23 five- and six-year-old students Monday through Friday, for a full, six-hour day. Many of the students come to school on school buses, or attend before- and after-school programming while parents are at work. Reflective of the community served by the school, his class this year, and every year, is extremely diverse. Students have a wide array of family backgrounds and countries of origin that span four continents – Africa, Asia, Europe, and North America.

When seeking to understand how and why Mr. Allen responds to his students' mistakes in the way that he does, it is first necessary to consider the environment in which he teaches. Mr. Allen enjoys the reputation of being an excellent teacher, and is a teacher-leader at Prince. For years, he has taken on roles above and beyond his classroom teaching, like leading his grade-level team, mentoring novice teachers who join the staff, and guiding initiatives on the school's Data Team – a group of staff members who analyze student data in search of ways to help teachers improve their work in the classroom.

In Mr. Allen's classroom, there are no worksheets. "When I look at a worksheet, it tells me maybe they knew the right answer and circled the right thing. Maybe they didn't... maybe they guessed." During his training in college, he came to believe that worksheets offer very limited information about what students actually know. As a result of this philosophy, he largely engages in workshop-based teaching for reading, writing, and math in which, after a brief whole group introduction, students engage in independent stations, doing work at their own pace. They rotate through various short activities when prompted, including one station in which Mr. Allen monitors their progress and gives individualized feedback when appropriate. In addition, each day, Mr. Allen has one or two designated 45-minute blocks of time set aside for work in a variety of classroom centers. His classroom is spacious and has several different centers students can choose from, including dramatic play, ABC table, the Discovery Table, block area, library, and the drawing table. Only a certain number of students are allowed to be in each space at a time, but once everyone has made their choices, the students can switch areas at their leisure as long as they move their cards on the centers chart to reflect the new location. While this is going on, Mr. Allen pulls small groups of students to the back of the room for instruction or interventions.

The children in Mr. Allen's classroom also spend one or two hours per day in whole group instruction. This includes shared reading and the daily class meeting. It is during these times that students, with scaffolding from Mr. Allen, get opportunities to try out ideas, practice making story predictions, and offer their best guesses during classroom conversations with their teacher and peers.

Mr. Allen works hard and he works well, but he also works within constraints all too familiar to many urban public school teachers. The copy machine is old and finicky and, even when it does work, there is limited copy paper available. Mr. Allen does not like to give students handouts very often and much prefers to use whiteboards. However, whiteboard markers are a rare commodity, and he has to exert a fair amount of effort teaching the students to be gentle with them so they will last longer. He has one classroom aide – Mrs. Stanton – who helps him manage logistics in his classroom. However, because his union only mandates a part-time paraprofessional, there is a rule – either at the district or school level (he is unsure which level) – that he does not get a sub when she is out for sick days or vacation. Although the classroom is big, the school building is old, and Mr. Allen constantly has to deal with issues related to its age. When it rains, water seeps up from the floor. He places boxes from the lunchroom on the floor to help soak it up and to keep the children from slipping and sliding on the puddles. Once after a heavy rain, the boxes are down. As Diamond walks quickly from her table, she slips a little as the wet box shifts slightly under her foot. Mr. Allen calls out, “Watch the boxes, Diamond. I don’t want you to get hurt.” Bathroom and sink access is limited. Although there is a single bathroom just outside of their door, it has one stall and is shared among 3-4 classes; so, Mr. Allen’s students only use it in case of emergency. Most often, the students line up and go all at once a few times a day, walking down to the cafeteria where there is a large girls’ and boys’ restroom. One of the classroom jobs is the “Clean Hands Helper,” who brings a small basket containing the things the students will need to clean their hands – a bottle of hand sanitizer, a bottle of liquid soap, and a stack of brown paper towels cut in half. After they use the bathroom, they come out to get soap,

go back in to wash, and then come back out to get a small towel before lining up to wait for classmates to finish. Mr. Allen frequently has to deal with mice, which periodically dart across the room during the day while the students are out of the room at lunch or at a class like gym or music. Recess time is limited, and the students only have one opportunity to go outside – after lunch at the end of the day, right before dismissal. Mr. Allen remarks that they simply go out at their assigned time so that they do not overlap with the older students in the school because it “would just be too many kids and not enough space” on the playground.

In addition to the issues he copes with in the school’s infrastructure, the emotional burden of the needs of the students is sizable, particularly with this cohort of students. “In nine years, this is the hardest group because there’s so many behaviors and all kinds of things going on. So, it’s just ...I’m tired every day...I feel like when I started, a few kids needed me more as a parent than a teacher. Everyone else just needed me to be their teacher. And then over the years, it’s just completely switched. I’m like ... I just can’t be a good parent to 23 people. So, it’s just...tiring.” He laughs to himself. “Tryin’ my best.”

In response, I smile and say, “That’s all you can do.”

Beyond his dedication to teaching and overcoming the various challenges and resource constraints he faces in his classroom, Mr. Allen also enjoys and excels at music performance. His love of the arts is most tangibly reflected in his classroom by the presence of several musical instruments that reside in his room: a worn upright piano; a pale-yellow auto-harp that lives on top of the piano; and an acoustic guitar with a light-colored wooden façade and a patterned shoulder strap. All three instruments are within easy reach of the large teacher’s chair in the meeting area. When I ask, he shares with me

that his instrument of choice is “definitely guitar, unless voice counts.” This makes sense, as I see him strum the guitar and sing with the children almost every day that I visit his room. He shares with me that, years ago, he received the classroom guitar from a parent who had recently upgraded to a newer model. In his view, although the hand-me-down is “not in great shape,” it still “sounds pretty decent.” The guitar “lives at school,” and I observe that it always sits by his side, ready for him to sing a song at a moment’s notice.

Mr. Allen’s use of the guitar in his class mirrors his approach to teaching and responding to mistakes in his Kindergarten classroom. Both as a veteran teacher and as a guitar player, he strums the instrument available to him. He does not dwell on what he does not have, but focuses on what he has. In his classroom guitar playing, he has an older instrument that is not ideal and does not provide the best sound. With a better instrument, he could produce a better sound, but this is what he has access to. Similarly, in his teaching, he does not necessarily work under ideal conditions, but does his best to address students’ mistakes and foster learning. He meets the students where they are, and works to ensure the best outcome possible for his students within the resource and time constraints of his school. In the end, his skill, experience, and dedication allow him to create beautiful learning out of the resources available to him. That said, Mr. Allen has to manage many pressures, most notably requirements to complete assessments and to nudge student achievement toward rising Kindergarten benchmarks.

Performing Under Pressure: Facing the Frustrations of Assessment and Achievement Pressure

As Mr. Allen describes it, mistakes are “just part of the learning process, right? If they weren’t making mistakes, they wouldn’t need my help.” Just as one would expect a

few wrong notes when first trying out a new musical piece, Mr. Allen expects wrong answers and misunderstandings as the children work toward the goal of meeting the district's grade-level performance standards. Coming into Kindergarten, the vast majority of his students have had some sort of Pre-K experience, whether in one of the classrooms at Prince, in Head Start, or in other early learning programs in the area. These settings can vary widely in quality and rigor of academic focus, as well as the teaching philosophy that guides day-to-day classroom activities. Regardless of their background or the level at which they started, all students are expected to read at the same level by the close of the Kindergarten year. There is a single standard despite the fact that there seemed to be a huge gap in his class last year (and every year) in what students were able to do coming into his class: "You had a kid who couldn't recognize their name in print, to a kid who starts the year reading at a second grade level." It is Mr. Allen's job to lead all students – even those entering with limited recognition of letter forms and corresponding sounds – to reading fluently by the start of first grade. A tradeoff of this heavy focus on reading is that he does not have the time or capacity to focus on correcting students' form in handwriting production, which has no official standards. "I think, unless they go to the Catholic school, they don't have someone breathing down their neck about how to form letters." And so, in lieu of other skills for which he'll be held accountable at the end of the year, he lets this go.

Despite his training and years of experience as an educator, his desire for small group and individualized instruction is often eclipsed by pressures to meet deadlines for various assessments he is required to complete. Mr. Allen has to administer seven different formal assessments over the course of the year. Each of these require him to test

all of his students on a variety of skills, including letter identification, sound fluency, expressive vocabulary, Kindergarten readiness skills (i.e., cutting, copying letters, jumping, fine motor, etc.), and reading level. With the exception of a few tasks on one of the tests, all seven must be given privately in a one-on-one administration. The most demanding test – for both student and teacher – seems to be the assessment for English Language Learners (ELL). Although he only has to administer it for a few students each year, it requires Mr. Allen to spend 90 minutes one-on-one with each child, and has bubbles that the students have to fill in for themselves. This year he had to administer it to seven students, representing approximately ten and a half hours of one-on-one time not focused on the whole class, and also not focused on individual instruction.

Standardized assessment is a topic that Mr. Allen brings up frequently during the time I am in his class. Time and again, Mr. Allen expresses a great deal of frustration about the tests, both because of how long they take to administer, and because of how they are structured and scored. He is pressured to perform as a teacher so that his students uniformly reach or exceed a set cut score. Although there aren't specific consequences for not meeting benchmarks, he is expected to "have a certain number of students score proficient" on the test. In essence, this makes Mr. Allen responsible for decreasing the number of mistakes made by each student to a level deemed acceptable by the district.

In pursuing this goal, Mr. Allen finds it "really upsetting...that their progress is in no way considered." For example, on one of the tests focused on alphabet skills, he shows me an instance in which a student had "a 700% improvement," and another criterion on which the score almost tripled. In both cases, despite substantial increases in performance over the course of the year, the assessment rubric indicates that the student

has failed. In Mr. Allen's view, the test does not adequately represent the amount of progress students make, nor the herculean effort he puts forth to increase those skill levels. "I hate it. I think it's really unfair [because]...improvement is not in any way used to determine how they're doing. Kids who are above and beyond, there's no increased expectation for them, and there's no scaled back improvement expectation for kids who aren't meeting those standards." Mr. Allen finds it hard to understand that despite the work he puts into helping the students correct their misunderstandings and build skills, the expectations are such that students who initially tested with lower levels of proficiency – but demonstrate huge gains due to his direct interventions – still receive failing scores, despite large leaps in their performance.

On another day, Mr. Allen shows me how a different assessment works. It is a task during which students have to read the words in order, and their score is determined by how far they get without making mistakes. They can make up to four mistakes, and then that determines their score. "The most frustrating thing about that reading test for me is that the first time I give it, for most kids, there is not a single word they can do...so, you stop at that level...it's like basically 0%...Some of the kids, they'll go, they'll make a total of four errors and make *all* the other words, but it is still considered less than [Level] A...there's like, such a difference between those two things." As he does the test with the students and tracks their mistakes along the way, Mr. Allen observes that getting none of the words right on the entire page counts for the exact same score as getting all of the words on the page *except* the first four. "What's frustrating is, like, there's no way to record it. It's just less than 90%."

Although Mr. Allen does not have control over the mandated assessments he must complete throughout the year, he has developed ways of informally tracking student mistakes and milestones as a means to improve and tailor his instruction. He shows me Google doc with a spreadsheet tracking system he developed himself in order to track which uppercase and lowercase letters each of the students recognized. He also has information about progress in letter sound knowledge. Despite the many formal assessments, there is not one that tracks this information, which is extremely relevant to his work as a Kindergarten teacher, according to Mr. Allen.

During assessments, students are not told what they got right or wrong. Unlike workshops, centers, and other interventions that provide a one-on-one interaction with the teacher with lots of comments and prompts to improve their work, these tests do not offer students any real-time feedback for improvement. And although the assessments often ask Mr. Allen to count the number of mistakes made, the information is not useful to him for instructional improvement. Instead, he explains that he simply collects the data as instructed, computes the scores, and sends his reports off into “cyberspace,” never to be seen or used again.

Despite his frustrations with the structure and demands of the assessments, Mr. Allen puts in a lot of effort to make the conditions the best that he can for the students when they are taking the tests. He has to put in some work to get the rest of the class to quietly engage in a second round of independent work and play at centers while he works one-on-one with students, either back at the table near the window or just outside the door in the hallway. The tests are often high stakes – the ELL test determines whether or not they will be in a regular classroom or sheltered English immersion in first grade, and

establishes the level of interventions that will be provided – and he is fairly transparent with the students about just how important it is to be quiet.

One cold winter morning, they are going over the day's schedule. Mr. Allen mentions to the class that they might have a "little extra centers at the end of the day... because I have to finish getting that test done as soon as possible so that we can get back to normal."

Later that day, just before they start the session, he again discusses the assessment. "I'm gonna be at the [back] table calling kids to work on tests, okay? So, if you need something, who do you need to talk to?"

The class calls out in response, "Mrs. Stanton," the aide in the classroom.

"Mrs. Stanton," he says, shaking his head from left to right, two or three times, looking out at the children. "I can't, I can't come look at something, even if you really want me to, so what I want you to do is take a picture with your brain and you can describe it to me later. Ok? And you can tell me about what you did." With this exchange, he clarifies with them the expectation about what they need to do when he is working one-on-one with a student doing the assessment. As an observer, this moment makes clear that when it comes to instruction and assessment, Mr. Allen is working on his own. Just as a guitar is typically a solo instrument, he is the lone source of instruction and feedback in the classroom. This responsibility is all on him, all of the time, with no help from anyone else. If he is not personally strumming his guitar, there is no live music. He is a soloist and the headliner featured in every act. If he is not personally driving activity in the class, there is no opportunity for learning and feedback.

Sometimes the voices get loud in centers during one of the 10-15 minute blocks during which he is working with a student. As the class is selecting centers on that same day, Mr. Allen makes an announcement: “I want to give a reminder that the only people who can hear you are the ones near you. Because Noelle has to do a lot of thinking.”

“I forgot,” Diamond says in response.

I imagine it is easy to forget to be quiet during centers. Outside of the test days, I do not observe this to be a time that is typically quiet. As he sits with students at the back table to do the ELL assessment, he asks the child being assessed to do a variety of tasks. Pick up and move cards, point at various pictures, identify different sounds. As they move through the test, Mr. Allen speaks in a soft and gentle voice, alternating between reading the assessment guide, shifting test materials around the table, and jotting notes on the assessment sheet. On one of these days, he works with Carrie, a small, soft-spoken girl with a heart-shaped face and a small chin. Her straight black hair swoops down the right side of her face and back into a thin, wispy ponytail that springs from the back of her head. He presents her with a picture card with a drawing of a school classroom on it. He asks, “Can you point to the teacher?” She points silently. “What’s this? What’s this? What’s this?” With each repetition, she points to various places on the card. “Very nice.” Later he asks, “Write the ‘*kuh*’ sound in the box.” Her small hand grasps a yellow, fat pencil, and she writes her responses as he calmly asks her questions. As I sit at a distance from them, his voice sounds muted and easily blends a bit into the noise of the room.

Finally, after 15 minutes, they have finished this last section of the assessment. Mr. Allen looks at Carrie and exclaims, “Done! You can go back to your center.” She

steps away from the table, he writes on his paper for a while, readjusts the assessments, and moves on to the next student. “Lily – you don’t need to take out your name but I need you here.” He starts again, administering the final section to Lily. On this particular day, he spends an hour and fifteen minutes out of the seven hour day – all of the morning and afternoon centers times – administering just a few segments of the tests individually to three students. This is a major time commitment in his school day.

As much as Carrie, Lily, and other students might enjoy the one-on-one time with Mr. Allen, these assessment administrations are decidedly not instructional. Although Mr. Allen mentions that “some teachers get subs during testing,” he notes that he never does. As a result, the testing supplants individual instruction time. During my time in the class, I notice that on the days when he does not have assessments, Mr. Allen is usually able to do Writer’s Workshop, his small group interventions, and Math Workshop rotations. When it comes to administering the tests, which I observe on nearly 25 % of the days I visit his class, the individualized instruction time during centers is scaled way back, much to his chagrin, so that he can complete tests with all 23 students within the timeframe given to him by the district. In lieu of Writer’s Workshop, the children are given additional unstructured time: “We are going to have a centers part two today because I still have to do that test for a little bit longer.” At one point, as he is about to start the ELL assessment with the last student, he looks over at me and says, “One more...” I immediately feel a sense of relief – he is almost done! Then he adds to his declaration, “...’til next month.” He explains to me that, although he is finishing this test, there are more on the horizon, just about all of which have to be administered individually with each student in a quiet setting and are not helpful to his instruction for the students. I

sigh, thinking of the disruptions that more tests will bring to their learning. Less time on individual instruction. More student energy focused on doing tasks for which they will not get feedback. I feel discouraged by this prospect.

It is within this context that Mr. Allen engages in the interactions that come with daily instruction. He teaches in a school environment that is supportive in many ways, but also is marked by constrained resources, pressure to meet benchmarks, and requirements to devote a great deal of time to completing standardized assessments. In the face of these factors, Mr. Allen works hard to create a space in which his students are given clear expectations for their academic and social learning, and in which he can leverage their mistakes to improve their performance.

Practicing the Mistakes Away:

Helping Students Refine Academic Performance

While the children often make mistakes in Mr. Allen's class, he devotes a great deal of attention to what they are able to do correctly. In his interactions with students, Mr. Allen frequently conveys that being right is a positive thing, and something to be proud of. One of his favorite affirmations when students get things right is to tell them, "Kiss your brain." This phrase is often accompanied by a kiss to the palm of his hand and a quick, open-palm pat on the top of his head, a motion that is frequently mimicked by the children. "I think a lot of times I just use 'Kiss your brain' if I'm surprised by something that they knew that I didn't think that they understood, or if they made some higher level thinking connection to something." Although he can't remember where he first heard of the phrase, it is prevalent in his class. He peppers this simple compliment

throughout the day, and it represents one of the many ways that Mr. Allen responds with wonder and excitement when students are able to do something brilliant. “It’s like ‘Kiss that brain! That was such a great idea you just had.’” Because he only offers this when students get the right answer, he is emphasizing that producing correct answers is important. At the same time, he is also telling them, in a sense, that he is proud of what they’ve just done, and that they should celebrate themselves, too. I imagine it could potentially motivate the children to give more thoughtful responses, and to seize opportunities to show off advanced knowledge and understanding in order to get this coveted expression of praise.

Often in class, concepts and skills arise that are very tough or “tricky,” but are either within the scope of the Kindergarten curriculum, or a challenge that a particular child struggles with on a repeated basis. As in music performance, the key to mastering difficult pieces is to push through in practice and keep trying the hard parts until playing the correct notes comes more easily and frequently. Similarly, I observe that when the children are working in a large group, Mr. Allen often uses open inquiry to draw them out, encouraging them to put forth their best guesses to answer his questions. He graciously works through whatever answers they offer, whether or not they sound right on the first go-around.

One morning during their meeting, Mr. Allen is talking to the students in the whole group about sight words, offering an opportunity to think about common words they read and see in class. “So, I’ve been noticing in your writing – in Writer’s Workshop – there are some words that you guys are often trying to write quite a lot. Okay, so what I’m gonna do is, I wrote those words down, and I put a magnet on the back, and I’m

going to put them up on the word wall over where all our names are.” Looking up at the word wall, I can see a similarly fashioned magnet with each student’s name, listed under a large print-out that corresponds with the first letter of each name. “So, if you’re thinking ‘Ooooooh, how do I spell that word?’, what can you do?”

“Look up there,” several children say, pointing up to the wall.

Mr. Allen mirrors them – reaching his arm up, holding it out toward the word wall. “Look at it right there and it will be there.”

Mr. Allen finds his first card and holds it flat against his chest, hiding the front side from the view of the students. “Who thinks – if you can raise your hand – who knows what word this is?” He flips the card around and shows it to the class.

“/!” the children call out in chorus.

Mr. Allen turns the card around and back to his chest, then holds it up again. “Oh, do not call out.” He turns his attention to one student. “What do you see?” He lets the student read the letter. Even as others are calling out, he does not acknowledge their answers and maintains focus on the student he called on. “/!” Mr. Allen exclaims. “Do you know you just read a word? *I* is a letter that’s a word.”

They continue on with another “easy-peasy” word: *a*. After the class guesses the word correctly, he gives a couple of students a chance to try it out in a sentence. “I saw *uh* train.” “I was *uh* dog.” He moves on by drawing another card and, after a quick glance, pushes it against his chest to hide it, as well. “This is probably the word that I see kids trying to write the most.” He shakes his head left and right as he issues a plea: “Please don’t call out ... Please don’t call out.” When he flips the card over toward the class, there is absolute silence in the room.

After a few seconds, one of the children breaks the silence. “*Wars*,” he says, lingering a bit on the *r* sound.

“Ooh—close!” After a quick beat, he notices a raised hand and says, “Lily, what do you think? Do you have an idea?” Rather than requesting that someone give him a right answer, he is offering Lily a chance to take a guess.

When he calls on her, her raised hand drops to the corner of her mouth. She stares at the card. Out of the silence, one student starts to repeatedly call out guesses. In response, Mr. Allen shakes his head left and right. While looking straight at the kid calling out, he says to the class, “If you’re calling out, you will not get a turn to try.” He turns his attention back to Lily. “What do you think it is?”

Ten seconds of think time have passed since she was called. Lily looks up at him and admits, “I don’t know.”

“That’s okay,” he assures her. He turns to other hands that have been raised. “What do you think, Noelle?”

Noelle drops her hand and tries out the word. “*Worss*,” she utters softly, looking up at Mr. Allen. It sounds like it rhymes with the word *norse*.

“Close. It starts with that ‘*wuh*’ sound. Scott.”

Like Noelle, Scott says his guess fast. It is quick and quiet. “*Wass*.” The way he says it rhymes with the word *mass*.

“It looks like it should be *wass*, doesn’t it? And that’s why I’m showing you this word.” Mr. Allen pauses. To this point, he has gotten four different student responses. *Wars*, *worss*, *wass*, and “I don’t know.” With each child’s attempt, he has affirmed the

response given and reassured that it's okay not to know it. "The word isn't *wass*. It's *was*." He repeats it. "*Was*."

Some of the children call out, "That's what I was going to say."

"Good. Kiss your brain," he replies, affirming their self-proclaimed correctness. "If I was going to write it how it sounded, I would write *W-U-Z*, but some words are not written the way that they should be. So, if you're trying to write 'I was,' just look at the word wall. They'll be up there."

As he talks, he holds the "*P*" card and the "*was*" card next to each other in the proper order. "I was...dancing." Extending his modeling, he makes one more sentence that starts with the words on the three cards, holding them up as he says them.

"I...was...a...Kindergartener when I was five." Mr. Allen demonstrates the new sight word in a sentence in order to place their understanding of the word "in context" and help model the "difference between letters, words, and sentences" – an understanding that he thinks is all too often taken for granted.

Although none of the students sound out the word correctly, Mr. Allen appreciates the attempts that they made, saying that he feels that "the effort is cool." He is glad that Noelle figures out that it started with the sound of *w*, and he gives her credit for this in their interaction. He is very glad that, although she wasn't able to think of an answer, Lily "still felt motivated to raise her hand and take a stab at it and think about it." His response is to "validate it" because he feels "it's not a big deal if she doesn't know – we'll get there." He shares that his favorite mistake in the lesson is actually Scott's because it applies "everything that I have taught them about letter sounds so far. Yes – *W* says '*wuh*', *A* says '*ah*', and *S* says '*ssss*'." But the focus of the lesson is presenting a few of

the exceptions that they “have to know by just learning them,” so they can access them quickly in reading and writing.

Even though all of the students’ guesses are wrong, Mr. Allen holds out for a long while before telling them the correct pronunciation for the sight word, allowing them to really think for themselves and sit with it. Like rehearsal for music performance, this is an important task, allowing the students enough time to practice the sight word skills they are in the process of building. Collecting many answers from around the room is a form of student inquiry during his instruction that allows different students to engage in the process and expresses that he is flexible and open to accepting a wide range of ideas from them. In this case, they are just learning this new word, and they do not come up with the answer for themselves. Later on, when they again go through all of the cards to practice, they still miss it. When this happens, Mr. Allen simply raises his right hand to his cheek, making the class’ hand signal for the sound of *W*. “*Was*. It doesn’t make sense,” he says, shrugging his shoulders.

For sight words, Mr. Allen does explicit teaching, mitigating the blow of wrong answers by explaining the challenges of remembering them. At other times, Mr. Allen arms them in advance with practical tools and strategies, like turning to the word wall to find a sight word, or singing a phrase from the Carole King song “Alligators All Around” to remember a letter sound. The song goes through a different phrase that is helpful to remember the sound of each letter. The first lines start with “*A-alligators all around; B-bursting balloons; C-catching colds; D-doing dishes....*” If they continue to be stuck, he will model the strategy in a way that helps the students find their own way toward the right answer. In Mr. Allen’s class, this principle is most readily demonstrated in his small

group work with the alphabet sound practice activity of the ABC Bingo Game, and with Writer's Workshop.

For instance, on almost every day that I visit Mr. Allen's class, I observe him calling over a small group of three girls – Lily, Olivia, and Clara – to play a simple game of ABC Bingo. Seven or eight years earlier, Mr. Allen's mother found the game set at a discount store and donated it to his class. Over the years, he and his students have used it daily, to the point that the bingo cards and accompanying pieces are, as Mr. Allen puts it, “a little loved with time” and “falling apart.” Near the start of centers time, as the other children build with blocks, pretend to cook and play house in the dramatic play area, or engage in other self-selected activities, he prepares the table for their daily practice. He grabs a small, plastic basket from the ABC games shelf near his desk and walks across the room toward the short, round work table positioned near the large floor-to-ceiling window. As he sits down, his tall frame compacts into the small child-sized chair – the perfect proportions for five and six year olds, but a tight fit for a man of average height. Yet, I watch him ease into the tiny chair, expertly folding his legs to the side comfortably. When everything is set up, he calls the students over to work with him.

“I need my girls who I play ABC Bingo with.” The students are identified for intervention based on Mr. Allen's frequent informal testing, and he tracks information about their knowledge of uppercase and lowercase letter recognition – as well as letter sound recognition – in his private Google doc. Looking to expand support for Reader's Workshop, he started integrating this game into his class years ago as a “literacy activity that kids could engage in that wasn't necessarily a guided reading book for kids who aren't necessarily reading yet.” In the fall of each school year, he uses the game with

students who need help building letter shape recognition – focusing first on uppercase letters and then, once that is better known, moving on to lowercase. Now, as they are in the second half of the school year, he is focusing on letter sound recognition. At the moment, he works with these three girls, but the membership of this small intervention group has shifted over the course of the year as student abilities progress. Early in my time visiting his class, one girl learned enough of the letter-sound matches that he no longer required her to do the daily intervention.

One by one, Clara, Lily, and Olivia come from different centers around the room and find a chair around the small table. They have played this game many times and know what to do. Once there, they begin to look through the set of bingo cards in the pile.

“Alright,” says Mr. Allen. “Pick quick because once you decide, you can’t change it.” With this reminder, each girl makes her final selections, drawing it close and settling into her seat to wait for the game to start.

At the center of the table, within an arm’s reach of all three students, sits the white, rectangular basket. In it are several laminated bingo cards and markers, worn and slightly curled from many years of daily use, featuring the image of a smiling cartoon puppy with white fur and large, tan spots encircling his eyes. The girls are sitting still and quiet, calmly waiting for the game to begin. Mr. Allen removes a baggie from the game box, and draws a card from it, launching the game without further instruction. “Ok. Ready. If you have one of the letters – or both of the letters – that make the ‘*kuh*’ sound.”

The three girls drop their gaze to look down at their boards. With the letter sound in mind, their eyes search their small bingo boards, scanning the grapheme pair options contained within each square of their four by two playing cards – eight possibilities in

total. With each letter drawn from the baggie, they either reach out toward the basket to grab one of the well-worn bingo markers – decorated with the smiling puppy’s face – or quietly wait for the next sound to be called. In this case, Lily reaches out for a marker to put on the *Cc*.

“Which one is it, Lily?” She silently picks up the marker and draws it toward a spot on her board.

Mr. Allen’s eyes track Lily’s hand as she places the marker. In a flat, matter-of-fact voice he says, “*C* makes the ‘*kuh*’ sound.”

At some points, the girls silently play the game, and Mr. Allen calls one sound after another without interruption. But there are always a few letters that trip up the girls – either by mixing up the sounds or by error of omission. In one particular session, he calls out the letter *Y*, and they have some trouble remembering the matching letter sound.

“If you have the letter that makes the ‘*yuh*’ sound”

Clara looks up at him with a broad smile and asks, “*U?*”

“Not *U*,” he says. “It should be *U*, but it’s not.” In this moment, Mr. Allen both affirms Clara’s guess, while also clearly indicating that she was not correct. Clara continues to smile as she drops her head down toward her game board again.

Olivia chimes in. “*W?*”

“It sounds like it could be *W*, too,” he says, again affirming the response. “*Y. Yuh* – yo-yo. *Yakkity-yak*.” As he gives the right answer, it is accompanied by a swift reminder of ways they can use the tools and strategies he’s given them to remember the sound in the future – “*yuh*” as the sound of *y*; yo-yo – the image for the letter *Y* from their Writer’s Workshop ABC chart; and “*yakkity-yak*” from the “Alligators All Around” song.

Mr. Allen pauses as they correct their boards. Olivia grabs a marker from the basket and places it on her game board.

“So, what sound does *y* make, everybody?” The girls are very quiet. “*Yuh*. Say it with me.” He chants, again repeating the sound – “*Y* says *yuh*. *Y* says *yuh*.” Clara and Lily softly mumble the chant with him and Olivia lets out a loud burst of the letter sound. “*Yuh!!*” she sings, lifting her body slightly out of her chair as she holds the note.

In the midst of this recitation, Olivia folds her right hand into a thumbs-up and begins moving it slowing up toward the ceiling. In this motion, she is making a non-verbal symbol for the letter *u*, a hand motion that Mr. Allen adopted from a curriculum in order to help students remember the easily-confused sounds of the different short vowels. With wide eyes and a smile, Mr. Allen reaches out toward Olivia and softly taps her hand, gently pushing it back toward the table. “That’s *U* for *uh*.” Olivia slinks back into the chair, her hands dropping to her lap and the wide curls of her long, brown hair cascading over the back of the chair, her cheeks still round with a smile. “Close, though!” he says, tapping her gently on the shoulder with his pointer finger. “You’re knowing those – you’re very close. English is a silly language with weird sounds.”

“It’s like crazy. Crazy,” says Olivia.

“It’s Crazytown,” he agrees. “Population: Us.”

In this instance, Mr. Allen gently corrects the students as they make mistakes, offering them opportunities to guess. In general, when the girls make mistakes during ABC Bingo, Mr. Allen softens the blow, but does make sure they eventually land on the right answer. When they cannot find the answers on their own, he offers gentle reminders of previously taught strategies they can use to help them out in the future. And, as he

commonly does in the classroom, he winds it down with a little joke. In this case it is one that helps the students understand why this might be so hard for them – the English language has weird sounds. Although the students do respond to the mistakes with subtle changes in body language, the girls remain smiling and engaged with their teacher and with the activity throughout the interaction. Despite their mistakes, they seem pleased to be working with him, and only express subtle, non-verbal responses to their mistakes. In the interaction, I observe that Mr. Allen strikes a balance between giving the children think time to ponder the letter-sound matches, but also giving them the answer for the items they do not yet know how to identify.

In his work to help the students become independent and self-reflective learners, Mr. Allen balances many considerations in order to put his principles into practice. When students make mistakes, or have a hard time figuring out an answer, he toggles between offering hints, asking questions, and providing mini-lessons to help them find their way to the right answers for themselves. As illustrated in these examples during ABC Bingo, he engages in a process in which he gives the students time to try to figure it out. When children make mistakes, he tries to “bring it to their attention and see if they can catch it without me having to tell them what it is... [I try to] let them look at it and think about it for a little bit, and then maybe my hint will get a little more specific if they’re not quite getting it right away.” A key part of his philosophy of teaching is about helping the students help themselves. He “would much rather... teach them how to edit and be reflective of their own work, rather than me just fixing it for them because then they won’t get any skills... or tools of their own when it comes to doing it later.” I observe, time and again, that when students struggle, Mr. Allen frames their mistakes as

challenges, and reminds them of the knowledge and capabilities they already have to fix the problem for themselves.

As the year marches forward, he shifts the focus of the small group from rote identifications to familiarity with books. While these foundational skills are important, he is also concerned with other elements of reading, and exchanges the ABC Bingo game for time with simple readers that emphasize “more print concepts, more reading behaviors like turning the page, there’s a word on the page they can point to.” In addition to recognizing letter shapes and sounds, Mr. Allen also wants “them to be able to have a book” because “they start to notice what their peers are able to do and what they’re not.” Some of the girls in the ABC Bingo group continue to need “consistent help” through the rest of the year. Going into first grade, he recommends some for a reading recovery intervention to help them continue to face these mistakes head-on and build their reading abilities. With these daily efforts, he works to give them opportunities to increase correct letter-sound identifications, and to set them up as best he can for the challenges that lie ahead in the next grades.

One of the times that the children are able to put these skills to use is during Writer’s Workshop. During this time, Mr. Allen assembles the students in small groups and is able to offer individualized feedback as they independently develop stories, write details, and produce illustrations.

“Writer’s Workshop is probably my favorite thing to teach because it gives you a real snapshot of what they are able to do in that moment. You can look at their work, you can talk to them about their work, and you can see what the next steps are a little more clearly. Like, oh, this kid is having a hard time coming up with a

story.... This kid's having difficulty drawing people. This kid's having difficulty putting a space between words."

In this time, he is able to pinpoint areas for skill development, and offer an open forum to "go practice" what is learned in more structured activities, like ABC Bingo.

During Writer's Workshop, the students sit at a round table, each with his or her own folder, paper, and pencil in front of them. On one particular Wednesday, Mr. Allen is working with one of five small groups at the small round table next to the window – the same place where he plays ABC Bingo. Mr. Allen carefully tracks each student's story topic in a computer document, and in this group, they have self-selected a wide array of topics. On this day, Taj is writing about a trip to the aquarium, Stella is writing about riding her bicycle, and Olivia is writing a story about the time she spent with her friend, Abigail. From his seat, Mr. Allen shifts his attention to each of the students at the table, skillfully engaging with each one individually, and rapidly shifting his focus from one to another, as needed. It almost looks like a type of juggling – he keeps each student moving in his or her own path, all at the same time, offering just-in-time feedback so that each of them can keep his or her work moving ahead. During the workshop, each student is typically at a different point in the writing process. Some are developing new ideas, while others are illustrating and adding story details; and then they use invented spelling to independently write the story text. Mr. Allen feels that, because "it's a workshop, the point is to look at it and see the things that are going really well, and then kind of offer suggestions for what they can try next time." He also appreciates that, unlike worksheets that are more prescribed and finite, "Writer's Workshop is never really done. We can leave things be or we can come back to them, or we can decide we're not gonna work on

them anymore. But it's a process. There's no real end." To Mr. Allen, this is an exciting opportunity for learning in his classroom.

At one point, while discussing her story with Mr. Allen, Olivia shares her current sentence. "ALL day I played with my friend Abigail." Olivia starts in on writing out her sentence. "Ahhhhhhhhhh-ll day"—her eyes are wide, mouth open in a round *O* shape.

Mr. Allen pauses Olivia's writing with a simple question. "What was the best thing that you did?"

Olivia stops writing and thinks for a moment "Uuum. Whole thing."

"Well," he says. "Pick one thing that you can draw a picture of."

"I can drawl [sic] everything!" says Olivia, excitedly.

"I want you to start with one and if we need another page, we can add another."

With this request, Mr. Allen redirects Olivia, and offers additional focus to the task that can help her to sidestep potential ambiguity, confusion, and frustration later on when trying to figure out how to illustrate her experience. "So, what was the first thing you played?" he asks, eliciting specific details from her real-life experience.

"Uh, we played. While we were at the science museum."

"So, okay, what were you doing at the science museum?" he inquires. Mr. Allen continues to go back and forth with Olivia. Through specific question-asking, his tone of voice, and his long-held attention, he expresses interest in learning more about her experience, without dampening her enthusiasm for her story. The result is that he helps her to focus in enough so that the story writing task is broken down into more manageable chunks, a strategy she can successfully implement on her own later. With several volleys back and forth, Mr. Allen helps Olivia to select and describe one of the

many, specific events she experienced with her friend. “So, start drawing you and your friend on that climbing structure,” he suggests, turning his attention back to other students as Olivia gets to work with her detailed illustration.

Although less concrete than counting correctly or identifying facts from a story, the mistakes I observe in Writer’s Workshop are more about rushing through a process, or omitting details. With Mr. Allen’s approach – focused on helping students to try things out – he promotes Olivia’s growth in both her current and future writing. Without this interaction, it is possible that Olivia may have gone many different directions with her story, perhaps not focusing enough to write a single story event that could be captured on one page. Mr. Allen asks questions as a means to draw out richer, more detailed work from Olivia and the other students. In his view, “the motivation and the learning come from the questions, and I have a more authentic picture of what they know and understand by asking them a question rather than giving them answers all day.” With this interaction, he provides an opportunity for Olivia to practice refining and articulating story details in a process that he is scaffolding, but that she is driving.

Some students are very excited about their stories and, like Olivia, they have lots of details that they want to get down. Other students are eager to finish up the task, and they rush to finish. In these latter instances, particularly when it comes to writing, Mr. Allen intervenes, prompting students to slow down. For instance, on another day during Writer’s Workshop, Mr. Allen and his students from a different small group huddle around the small round table near the back of the room. He slowly shifts his attention from one paper to another, pausing for feedback along the way. At one point, he tells Ahmed, “I want you to slow down so your letters are perfect, so I can really read it.” –

pushing for him to make his best effort in penmanship. Then, as he makes his way around the table, his eyes are drawn to the paper in front of Angelo, a small Asian boy with dark brown eyes, brown hair, and a slight lisp. At that moment, he is drawing a picture of himself and his brother riding the subway train – both with their whole bodies colored bright yellow, and without clothing. As Mr. Allen’s gaze drifts to Angelo’s paper, his eyebrows raise. “In Writer’s Workshop, there’s no rushing,” he says. “I want you to do your *best* best job.” When later reflecting on this interaction, Mr. Allen notes that, by repeating the word, he is emphasizing to Angelo that, with benchmarks like his stack of monthly self-portraits from over the year, he knows what Angelo’s “*best* best looks like. This isn’t it. What can we do to make it more like that?” Mr. Allen can sense the resistance that Angelo has to the activity. Although he technically is completing his work, his mistake is that he has rushed and, by comparison to Angelo’s prior drawings and writing, is not giving the task his all.

After Mr. Allen’s comment about rushing, Angelo sits quietly in his chair for a few moments. He turns and looks at his neighbor’s paper and asks about the lasers she is drawing. His pencil twirls in his right hand. And after some time has passed, without making any revisions, he holds his paper up again toward Mr. Allen, tucking the top edge of it into his mouth, between his lips.

Looking at the unaltered drawing, Mr. Allen urges Angelo to improve his work. “I want you to add more details about you and your brother. You look like mustard.” With this response, he is playfully “trying to joke with him a little bit” in order to motivate him to make more effort to make his illustration better represent what he looks like in real life.

With the paper still in the air, Angelo retorts, “Is it because I ate so much mustard and I turned into mustard?”

“Nice try, Angelo,” says Mr. Allen. “I want you to pick out an outfit for you and your brother.” This is a type of prompt I’ve observed many times during Mr. Allen’s Writer’s Workshop. Again and again, he reminds students to carefully attend to and represent the fine-grained details of their experiences.

Angelo writes for about two more seconds, then holds it up again, tapping it to get Mr. Allen’s attention. “Am I done?”

“What do you think?” asks Mr. Allen. “What more details could you add?”

Angelo looks at his paper. “Houses.” Mr. Allen returns his attention to other students and Angelo gets to work drawing some big squares on his paper, surrounding his sketch of his brother and himself. Twenty seconds pass, and he’s already checking in again with Mr. Allen about the picture.

“Ok, which one is you and which one is Zack? I think you have brown hair.”

In response, Angelo grabs the brown crayon and swirls the brown around the page in a circular motion for a few seconds, then holds the paper up again toward his teacher. Mr. Allen looks at his work again. “What about labeling you and your brother and the subway train?” He turns back to another student, prompting details from her, too.

Before he can turn around, Angelo holds it up again. With furrowed eyebrows, Mr. Allen looks at Angelo for a few moments before again asking, “Where are your labels?” Angelo continues to resist and the conversation shifts – he indicates that he does not want to keep doing this. “Well, that’s Writer’s Workshop. At school, sometimes you

do things that aren't your favorite. 'Cause when I show this to your mom, I want her to say, wow, Angelo really did his best. Not wow, I think Angelo rushed."

Angelo resists throughout the workshop today. As the time in Writer's Workshop draws to a close, Mr. Allen makes a general announcement to the table for the benefit of Angelo and the other students. "I'm gonna let you guys be done, but next time I want to see a lot less rushing....I know what your best work looks like. This is your rushing work."

Later reflecting on this teaching moment, Mr. Allen remarks that, "If Angelo was unable to do those things – if he couldn't differentiate between colors, if he couldn't draw details about setting, if he couldn't hear sounds and write them down – I wouldn't have pushed it so much. But he was capable of doing all of those things – he just didn't feel like it ...Sometimes in school there are things that are have-to's." Because he knows what Angelo is capable of and has evidence of how much he has grown over the year, Mr. Allen continues to push him, despite his resistance. In that context, he seems to consider not trying your hardest to be a mistake, as trying your best is an expectation of the class. Because Mr. Allen has the students draw a monthly self-portrait – which are clipped on a bulletin board in his classroom – he has a good sense of Angelo's drawing and writing abilities, and can tell he is not performing at his best. "Thank goodness for those self-portraits. I think they epitomize what their absolute best drawing is, so it's something that I can point to." This strategy allows him to not only have concrete information about the students' capabilities, but also to have leverage to push them when they aren't giving their all in their work. Having a tangible reference to point to helps Mr. Allen hold the students accountable to him and to themselves.

Tuning the Strings: Refining Students' Classroom Behavior

Although teaching often revolves around academic skills and content, much of the work of an early childhood educator involves the social development of children.

Additionally, in order to get things done with academics, behavior management is necessarily a central aspect of the workings of the classroom and the interactions around mistakes. In this sense, his goal is not only to help the students to practice their Kindergarten academic performance, but for them to learn and fine-tune the social skills that will allow them to operate effectively in school, both in his class and beyond.

Mr. Allen's classroom has clear rules and expectations about how the Kindergarteners should operate in the room, how they should move their bodies around the shared spaces, how they should engage in their work, and how they should treat each other. When students do not meet these norms, they receive feedback from Mr. Allen, indicating that they need to adjust their actions. In this sense, misbehavior is a sort of mistake, particularly when one of Mr. Allen's central goals is to help them become better citizens and learn how to operate in a classroom, so that they will be ready for upper grades. He "rolls out" his expectations "slowly" in the beginning of the year because he feels that if he introduces "too many things, all at once, none of it is really gonna get done." He particularly focuses on three main facets of their behavior: kindness, working hard, and trustworthiness. He remarks that, "Those are words we hear an awful lot in Mr. Allen's class." He spends a great deal of time "hammering in" the meaning of these words, and helping to build a "stockpile of moments" from their experience in the class to give the concepts meaning.

Reflecting on his teaching, Mr. Allen remarks that, “I feel like I’m very clear about behaviors and what they should look and sound like at different times. And there are some kids that just need to be redirected a lot.” In his Kindergarten classroom, Mr. Allen offers as many – if not more – corrections on students’ behaviors and social choices as on their academic work. As demonstrated earlier, his corrections of academic mistakes tend to be focused on helping the student correct himself or herself and are shared in a gentle way. When classroom rules are broken or social norms are breached, he continues to try to promote self-regulation, but is much sterner in his tone and approach when communicating about these mistakes with the children.

For instance, a phrase I commonly hear from Mr. Allen is “I’m worried.” When Mr. Allen starts to worry, it is a signal to his class that their behavior is not meeting his expectations. He uses the phrase on an almost daily basis, as the students test boundaries of the rules and lose focus at various points in the day. Rather than tell them directly the choice that he wants them to make, the phrase “I’m worried” signals that it is time for them to reassess what they’re doing and think about what is expected of them.

Each day at the start of centers time, Mr. Allen passes out what he calls “names” – printed photographs of each child with a label affixed to it displaying the person’s first name. The centers chart hangs near the floor on a closed storage closet door in the room. It has several rows of long, narrow, clear plastic pockets, and on the left side is a column of choices the children can select. Mr. Allen calls the students’ names one by one, at which time they are individually dismissed from the meeting area and can go over to wait in line for a turn to place their name cards next to the center where they wish to play. The order matters, and as the children line up to make their choices, Mr. Allen is worried

about the volume of noise in the classroom. “I’m gonna remind you – thank you, Olivia – you’re being a great listener,” he says, pointing at Olivia. “Amelia – you are being a great listener – your eyes are on me. Thank you, Diamond.” Mr. Allen reaches down to a child just in front of him, places a hand gently on his shoulder and, looking him in his eyes, asks, “Are you with me, too? Are you with me right now?” The boy shakes his head up and down in response to Mr. Allen’s softly spoken questions. “Thank you.”

Mr. Allen broadens his attention back to the whole class. “I need quiet, calm voices and quiet, calm bodies today.” He pauses for a moment, looking at the students. As he continues, I watch tension enter his face, as the skin on his forehead starts to form thick wrinkles. “Ok? I had to tell people a lot of reminders yesterday. To the point where they had to leave the centers they were in, because I had to remind them so many times. And I said, ‘if I have to remind you about how loud you’re being one more time, you’re going to have to leave and go to a different center.’” He shakes his pointer finger at the class as he re-enacts what he told them on the prior day. “Did I really do that?”

“Yeah,” reply a few students in unison.

“I did,” he affirms. “Do I like doing that?”

“No!” the class yells.

“Absolutely not. I want you to be able to play in the center that you want to play in. But if you’re going to be loud and rude to your friends, Kevin, who are trying to take the test, you will not be able to be at the center you want to be at.” He shakes his head left and right a few times, indicating their choices will be restricted. “Okay? Who’s going to do a great job using quiet, calm voices?” Before he can even finish the question, the students raise their hands into the air, giving him an affirmative thumbs-up sign. He

mirrors their gesture as he pivots his head slowly, looking at the quiet thumbs-up across the room. “Awesome!” he says with a nod. “Thank you.” He continues to pass out the name cards and the children carry on, quietly making their selections for centers.

The mistake of the moment is not paying attention during the group meeting, and Mr. Allen does several things to help the students self-correct their behavior. First, he pauses the action of the classroom and, with his worry, he makes them aware that something is not as it should be. Then, in addition to clearly describing the behavior he wants from them, he also draws attention to students who are already meeting the expectations. In doing so, it affirms those students, and it encourages other students who are not on task to turn to their peers to see nearby models of expected behavior that they can copy themselves. Next, he uses a series of questions to help the children recall past events, reminding them of the consequences for not shifting their behavior. And finally, he asks for a pledge from them, that they will continue to use “quiet, calm voices,” thanking them in advance for their adherence to the norms. Moments like this are helpful to re-center the children in the immediate moment and to get the class back on task, as well as a means to help prevent these sorts of misbehaviors in the future.

Another way Mr. Allen helps students understand the expected norms of politeness is through Emily Post, an early 20th century author who published books on manners, including her best-selling book *Etiquette in Society, in Business, in Politics, and at Home*. Mr. Allen was first introduced to Emily Post as a college senior during a brunch focused on teaching etiquette. At this event, the presenter emphasized the importance of knowing the “norms of eating” that would be useful when “entering the business world” and having meetings in fancy restaurants with “a potential client or a future boss.”

Although Mr. Allen does not feel like he is a part of that particular social world, he “loves the fanfare of it all” and has carried these lessons on etiquette forward. He began referencing Emily Post in his classroom just a few years back, and she has become a central figure in the class ever since, particularly in relation to eating, and how students interact with others following norms of politeness. Each year, he shares a children’s book with them called *Emily’s Everyday Manners*, along with another book called *Do Unto Otters*. These stories both center on manners, and the books – as well as the embodiment of the ideals of Emily Post – become a reference point for the year.

From *Emily’s Everyday Manners*:

“Emily and Ethan love their family and friends. They want them to feel good. So they do kind things for others and use manners every day.”

“Good manners take practice. Sometimes family and you can forget. But they never give up trying!”

This storybook and the legendary status of Emily Post serve as both model and aspirations for how the children should strive to behave and treat each other in their classroom community. Mr. Allen enacts the principles through both positive comments about student behavior – “It is nice to have a calm, Emily Post snack with our friends.” – and through corrective feedback dissuading rude student behavior – “Push your body all the way [in to the table]. Emily Post!”

I find it interesting to witness just how powerful the influence of Emily Post is in this class. I see on multiple occasions that the students do correct inconsiderate behavior when they are simply reminded of her name. For example, one day during centers time, several children are playing in the block area, and the expansive structure they were

building extended over into the neighboring dramatic play area. Ahmed quietly slips away from the block area and tries to shift to a different section of the room, sidestepping the big task of clean up.

Mr. Allen sees this and calls him over for a heart-to-heart talk. “You were just allowed to return to the area yesterday.” He continues to talk through this individually with Ahmed, drawing his attention to the blocks, which cover the floor and are thickly stacked on top of each other. After they finish their discussion, Ahmed and the other boys start to work together to pick up the pieces. Mr. Allen continues to chat with them about the border for the area, asking them where the edge is between blocks and dramatic play.

After talking with them about this for a little while, he walks over to the piano, picks up the picture of Emily Post, places it on a shelf facing them in the block area, and simply asks “What would she think?” As Mr. Allen walks away and turns his attention to other activities in the room, the group of boys in the block area, including Ahmed, continue working diligently to put away the blocks on their own. After observing that the boys were having a lot of trouble cleaning up, I am surprised to see that just a few minutes after the picture was brought over, the area is completely cleaned up and they each move on to another center. This is an example of the way that the physical object of the framed photo can serve as a “nice little visual reminder” of polite and responsible classroom behavior, and an easy way for Mr. Allen to remind them of the right thing to do, just by saying, “She’s watching you from afar!”

While sometimes Mr. Allen has a direct Emily Post intervention, as in the case of the sprawling block area, she is just a simple reference at others. Almost daily, either Mr. Allen or his aide reference Emily Post during snack time. When the students are being

loud, talking with food in their mouths, or don't wait for all of their friends to get their snacks before they start eating, he draws attention to it. "There are a few people I would not want to take to a fancy restaurant." When the children are demonstrating nice manners, he also brings it to their attention. On occasion, they eat quietly as soft music plays in the background. "It is totally okay to talk in a soft voice with the table. You don't need to yell to be heard. The only people who need to hear you are right next to you. Oh, it's so much better in here.... If you can hear the harp music, you are doing the right thing. And your friends are doing the right thing. It is nice to have a peaceful snack with our friends where we speak in calm voices and don't yell at each other."

In short, the students' relationship with the larger-than-life Emily Post allows a clear model of expectations that help Mr. Allen to correct impolite behaviors as they arise. He views the framed photograph of Emily to be a really useful "visual reminder" for the children that he can "just point to" if someone is being rude. He hopes that, both within his class and long after, she can serve as "a great example of remembering manners and remembering to be polite," as well as "group norms of friendliness and turn-taking." Thinking back to my experience as a Kindergarten teacher, I can understand just how necessary it can be to make these sorts of abstract ideas more tangible for students. I can also imagine that some people, watching from the sidelines, may have some questions about using the picture of an elderly White woman as a model of behavior for a diverse class of young students. But, as far as I can tell, it is an effective way for Mr. Allen to help the children learn how to be considerate of each other, and reinforces the attributes of trustworthiness and kindness, two highly-esteemed values in their classroom community. Emily Post seems like a positive addition to the class, and helps students to

have clear ideas about how to monitor and self-correct their own behaviors. Her picture serves as a simple prompt for students to assess and adjust their actions according to the norms they have learned, with little intervention from Mr. Allen.

In that same vein, Mr. Allen often gives students time for a do-over to correct their group behaviors. When the students collectively lose focus, he squeezes his eyes shut and says, “I need my meeting back in three...two...one...zero.” His eyelids lift back open again, he looks out at the class, and continues on with the activity.

The countdown to reset is a common classroom management technique that Mr. Allen uses. When students are talking over him when he is speaking, or children are calling out answers rather than raising their hands, he breaks through the noise with a simple countdown. Often this response happens as the children are sitting on the rug, having a discussion as a class, or as they start calling out or yelling out answers.

He quickly counts down relatively often to reset the class if they are talking during the meeting. However, if their attention gets too unfocused, which happens occasionally, he takes it further than simply closing his eyes. For instance, one morning the students are talking loudly as he is preparing to review the daily schedule with them. The volume level in the room is loud and some children are not focusing their attention on him and the schedule; instead, they are debating about whether or not the word *crazy* is a bad word. Suddenly, his brow furrows, ushering a worried look onto his face. He pauses and says, “You know what? I’m gonna leave and come back, and when I come back, people are going to know not to call out.” The room falls silent. As the children look on, Mr. Allen stands up. He begins the short journey from his teacher’s chair – stepping around them as they sit on the rug in the meeting area – to the door just behind

them at the back of the room. Once there, he reaches his hand into his left pocket, pulling out his keys, looking at them and using them to unlock the door. As he does this, the children continue to watch. A few are smiling and seem to be holding back a laugh, but most are silent with serious faces, tracking his every move. After several seconds, he kicks the doorstep to the side with his foot, and raises his hand to give a quick wave to the class as he exits the room. The heavy metal door, which is almost always propped open, drops closed with a thud. This is a lengthy process, during which time the students' necks are turned behind them, watching every step with blank looks on their faces. After he has left the room, the silence continues. The children begin to break their attention from the door, looking around the room and at each other, momentarily teacherless.

After four seconds in the hallway, Mr. Allen opens the door and re-enters the room. "Good morning, everyone," he says in a hushed voice, pushing the door back open and repositioning the doorstep.

"Good morning, Mr. Allen," the children say sweetly in chorus, necks backwards to face him as he speaks. Several serious faces blossom into smiles as they quietly continue to watch him.

Mr. Allen addresses the class from the door. "I am going to come to my seat, and I am expecting great school listening looks. That means eyes are watching, ears are listening, voices are quiet, bodies are still, and hand is raised when you'd like to talk." After this reminder of the expected behavior, he walks up to his chair and turns to face the class. Once he arrives, he looks at the students. Stretching his pointer finger toward Noelle, he says, "Noelle, I love your school listening look. Alex, love it." The children all sit quietly, watching Mr. Allen as he talks. He then makes his way around the room

saying “Love it. Love it. Love it. Love it. Love it...” on and on in a rapid-fire rhythm, making eye contact and pointing to a different child with each repetition of the phrase. When his gaze reaches the last of the students – a boy who is sitting quietly in that moment but often is not focused or quiet during group meetings – he says, “Extra love it. That’s 100% right there.” Then, without missing a beat, he picks up where they left off, reviewing the day’s schedule.

In a frenzied moment during which the students collectively lose their focus during the group meeting, Mr. Allen gives them a chance to have a do-over. By leaving the room or, in other instances, by closing his eyes and counting backwards down to zero, he signals to the children that they have a chance to gather themselves and refocus outside of his watchful eye. When he gives them that second chance, time and again, they rise to the occasion, recalibrating and offering the “school listening looks” requested by their teacher. Although the interaction begins with a statement of expectations not being met (e.g., telling them they need to not call out), it ends with praise and continuance of their learning, with focus.

The Circle Game

*“And the seasons, they go round and round
And the painted ponies go up and down
We're captive on the carousel of time.
We can't return, we can only look
Behind from where we came
And go round and round and round
In the circle game.”*

Mr. Allen frequently grabs his guitar and sings with his students. One of his favorite tunes is the Joni Mitchell song, “Circle Game.” As he easily strums the strings on the instrument and sings in his beautiful tenor voice, the children join him in singing while sitting on the rug in the library. As with his teaching, he takes the guitar into his arms, applies his expertise and experience with this old song that he knows and loves, and makes beautiful music with it, just as it is.

The lyrics of this particular song offer an interesting metaphor for the passing of years, and the changes that occur as a young child grows up. Considering the journey that Mr. Allen goes through with his students over the course of the year in Kindergarten, the song is very appropriate. This idea of growth over time also reflects his sentiments on mistakes and growth in his classroom:

“Things are going to get messed up and things aren’t going to be clean and neat all the time. But if you can look at where they are in September and then where they are in June, you will see a world of growth if you’re patient enough to let the process run its course.”

Working in a context of high pressure to meet district end-of-year benchmarks, Mr. Allen is clear that getting things right is important. But he also creates space for students to think, he allows opportunities to self-correct behaviors and mistakes in academic work, and he protects children’s opportunities to hypothesize and try out new ideas. Throughout each day, Mr. Allen demonstrates in his class that he values students’ opportunities to learn to do and think for themselves. In addition, when he is working with students who have made mistakes, he feels that if you “just fix them without any explanation, you’re denying an opportunity for growth.” With the passing of time, each

child will grow and move forward, if given the opportunity to try, to make mistakes, and to learn. No matter the state of the instrument or his limited access to resources, Mr.

Allen tries his very best to create the best music and the *best* best learning that he can for the children in his care.

Portrait 2

Mrs. Tucker: Orchestrating Learning from “Oopses”

Anna Tucker’s students are gathered on the floor in the meeting area of her Kindergarten classroom. Each child is seated on one of several brightly-colored squares within a neatly-lined, rainbow-striped pattern on the rug. Mrs. Tucker sits in a pale turquoise chair situated to the right of a whiteboard easel on wheels, perched slightly above the heads of her students. She is a tall woman with fair skin and shoulder-length, straight brown hair that flips into a curl at the ends. Today, she is dressed in black from head to toe – black turtleneck sweater, black pants, and black dress boots. She rises and steps across the rug toward the window, grabbing a wooden stick with a black and gold pom-pom attached to the tip.

“We are gonna play Catch My Oops,” Mrs. Tucker says in a silly voice, her words lilting across the phrase. She shakes the pom-pom with each syllable as she marches back to her chair. As she settles back into her seat, she asks the students, “Are you ready?” The students’ eyes are all turned toward her; she has their rapt attention. “I am going to write a sentence and there’s gonna be some oopses in there and you’re gonna have to catch them.” She reaches toward the lower shelf of the whiteboard. “We have not gotten Bonkers out lately.” Mrs. Tucker pulls out the old puppet, a wild creature with a red body, bright orange lips, yellow tufts of hair, and large bulging eyes, who – as she puts it – “looks like he’s had a really rough day.” She places it on her hand and launches into the game. “So, I’m going to write with the marker and then I’m going to pass the marker to you. And you might get a chance to... Catch... My... Oops! All right, let me put on my oops hat, which is pretty much always on.” She holds her head back for a moment, and

appears to be thinking silently to herself as she continues to shake the pom-pom. “Let’s see... Let me think, hmmm... Ready.” With those words, Mrs. Tucker draws a vertical line on the board, then stops and says “too big,” erasing the line with a nearby towel.

One of the students calls out: “Oops!”

“Oops,” echoes Mrs. Tucker. “I already oopsed.” She reaches down to the lower shelf of the whiteboard easel and draws out an oversized green eraser from among the many items stored there. The word “OOPS!” is printed on it in white, bolded, capital letters. “I better put this up because I’m definitely going to be doing that.” She places the eraser on the ledge of the whiteboard easel and, with the students still quietly watching, writes a simple sentence, which the class reads in chorus:

tobay Is Tuesday.

Hands go up around the room and someone calls out a guess. “If you see an oops, raise your hand,” says Mrs. Tucker. “Bonkers might let you catch one of my oopses.” She first calls Samuel. “Find one of my oopses,” she says, as he approaches the front of the room. Samuel stands right up near the board, about as close as he can get. She extends her hand toward him and offers him a marker, telling him to “write on top of it to fix it.” Then, she whispers to Samuel, “Trust yourself.” With that small gesture of encouragement, he adds a small loop on the left side of the lowercase *b* in *tobay*, turning it into a lowercase *d*.

today Is Tuesday.

“Nice!” affirms Mrs. Tucker. “Tell everyone. What was my oops?” Samuel steps to his right a little bit and points silently to the *b*. “It’s not *tobay*,” says Mrs. Tucker. “it should be ...”

“...today,” says Samuel, finishing her sentence.

“Ding!” Her voice rings out, in celebration of Samuel’s correct answer. “You caught one of my oopses.” Samuel returns to his seat and Mrs. Tucker calls Stephania next. She jumps up from her seat on the floor and skips to the front of the room, her thick, wavy, dark brown hair bouncing gently with each step. Once at the board, she draws a horizontal line over the top of the first letter of the sentence.

~~T~~oday Is Tuesday.

“What was wrong with my *t*, Stephania?” asks Mrs. Tucker.

“You did it well,” she replies. “It was just a lowercase.”

“Why does it matter, Stephania?” Mrs. Tucker inquires.

“Because it's supposed to be uppercase.”

Bonkers starts to bounce as Mrs. Tucker talks. “Because it's the beginning...”

“...letter...” Stephania adds.

“... of a sentence,” ends Mrs. Tucker. “That’s right.”

Next, Ryan is chosen to play. “What are you going to catch?” Mrs. Tucker asks.

Ryan walks up to the board, crosses out the *T* in Tuesday, and adds a small uppercase *M*.

~~T~~oday Is M~~T~~uesday.

“Nice,” says Mrs. Tucker. “What are you thinking? Tell everyone. What was my oops? Today is Tuesday.” Ryan is one of the shyest students in the class, and speaks very softly; his voice is inaudible from where I am sitting across the classroom. Mrs. Tucker repeats what he has said. “So, you changed my *T* to an *M* because it’s not Tuesday, it’s...”

The children say in chorus: “Monday.”

“Monday,” she repeats. “Can I help you finish fixing that oops? Because I know it’s a long word. Nice job, Ryan. Wow... Ryan said that shouldn’t be Tuesday, it should be Monday. He put the *M*. He’s said, ‘It’s not Tuesday, Mrs. Tucker.’” She starts to write a word in red whiteboard marker, beginning with an uppercase *M*. “He says it should say...” She draws out the last word, prompting students to fill in the blank.

“Monday,” says the class together, as she finishes writing the word just beneath the original sentence.

Today Is ~~M~~uesday.
Monday

“Nicely done.” Mrs. Tucker starts to look around at the class. “There is one more oops.” Hands are up all across the room. “How about Mel,” Mrs. Tucker whispers. Melissa stands up, quickly takes the marker from Mrs. Tucker, and stands silently in front of the board.

“Okay, send her brain mail. No voicemail, just brain mail.” This is a phrase Mrs. Tucker spontaneously invented years ago in her classroom. She uses it as a way to protect think time, reminding the class not to call out with their voices, but instead to imagine they are sending their answers over to a fellow student, directly from one brain to another. There is not a sound in the room as students are sending brain mail to Melissa. She stands facing the whiteboard, her back to the class, marker in hand. Several seconds pass and she still does not write anything. Mrs. Tucker begins to chant, “Trust yourself! Trust yourself!”, shaking the pom-pom with each word. The students quickly join in with her in support of their classmate. “If you’re not sure,” she says, “you may whisper to the front row.” Melissa

kneels down and consults with a couple of her classmates. Mrs. Tucker again starts chanting “Trust yourself.” Suddenly, Melissa jumps up and starts writing on the board.

“What’s wrong with my beautiful *I*? I think you figured it out...” Melissa writes a dot above the uppercase *I* in the word *Is* and Mrs. Tucker gasps.

Today Is M[•]Tuesday.
Monday

“Mel! And why should it be lowercase?” She wrinkles her nose as she asks, “Is it the name of something?”

“No,” replies Melissa. Mrs. Tucker wrinkles her nose again and quickly shakes her head left to right.

“Is it the beginning of the sentence?” Mrs. Tucker’s nose remains wrinkled, head still shaking no.

“No... No...,” says Melissa, shaking her head left and right in sync with Mrs. Tucker. Melissa continues in a soft voice: “...it’s because it, it, it’s the beginning of a sentence.”

“Well this,” says Mrs. Tucker, pointing to the *T* at the start of the word *Today*, “would be the beginning, right? This,” she says, pointing to the letter *I*, “is in the middle of the sentence. So, I agree... It should’ve looked like that.” Mrs. Tucker writes the word *is* – all in lowercase – directly below the word in the original sentence. “And if it’s easier to see this way...” It is silent as Mrs. Tucker takes a moment to write the word *Today* with an uppercase *T*, rendering the full sentence underneath the version just corrected by the students. “Help me read, please.”

Today Is M[•]Tuesday.
Today is Monday

With Bonkers in hand, Mrs. Tucker points to the first word, cueing the class to join her. “Ready, set...”

All together, they read the sentence as a class: “Today is Monday”

“And I just made another oops,” she says, smiling. “Can anyone see my oops in the oops?”

After a couple of seconds of silence, Jasmine suddenly sings out, “*Punctuation.*”

“Sing it again, Jasmine,” calls out Mrs. Tucker.

“*Punctuation!*” the class sings altogether, and Mrs. Tucker asks Felix to add a period, completing all of the corrections to the sentence.

●
~~Today~~ Is ~~M~~Tuesday.
Today is Monday.

“Now you know how to play... Catch My Oops. Did you notice that one of your morning activities this week is a Catch My Oops every day? We will keep playing Catch My Oops. I’m going to leave the pom-pom here and Bonkers would like to say ‘Bye! See you later!’”

Together, the children call out “Bye! See you later, Bonkers.”

Meet the Maestro: How Mrs. Tucker Leads Learning from Mistakes

From day one, Anna Tucker welcomes me into her Kindergarten classroom with open arms. Each morning I am greeted with a warm smile and she seems very glad to see me, even commenting on several occasions how much she likes to have me there with her in the class. On my first morning in her classroom, she and the students sing their “Good Morning” song to me in chorus:

*“Good morning, good morning, good morning to you!
Good morning, good morning, we’re glad to see you!*

Good morning to you,” they all point at me at her prompting, and I smile.

“Good morning to you!” they continue, pointing in every which direction at fellow students.

*“We sit in our places with sunshine-y faces,
Oh, this is the way!
To start a great day!”*

I later find that there will be a personalized moment in the song to serenade me just about every time I am with the class for this morning meeting. And, in addition to being warmly greeted, I am routinely invited by Mrs. Tucker to grab food from her secret stash of snack bars, saltine crackers, and juice boxes; she welcomes me to place my belongings in her personal teacher closet behind her desk; and she asks me, along with the children, whether or not I’d like to place an order for a school lunch. Needless to say, due to Mrs. Tucker’s warmth and kindness, I feel cared about and completely welcomed in the classroom community just about immediately.

I quickly come to admire the way that Mrs. Tucker is not shy about facing mistakes as she skillfully instructs the 21 students in her Kindergarten classroom. Drawing on her 25 years of teaching experience – 19 years in Kindergarten and six years in a special education middle school – this veteran teacher frequently discusses, confronts, highlights, and even cheers the mistakes that she and her students make. “I think that the sign of a classroom that has a lot of learning going on, you’re gonna see a lot of mistakes. And they’re not gonna be quiet, and they’re not gonna be viewed as negative.” As the students play their unique instruments of learning, Mrs. Tucker expects a few wrong notes or missed entrances, and wants them to be brave enough to just keep

playing through the mistakes. She also feels Kindergarten teachers hold one of the “most important” jobs in education. She believes that because “you’re bringing them into a whole new environment...it’s so key that you help them love coming to school and being excited and that they trust you and they like you.” Helping them to be happy in school is her biggest goal, and she works to foster this in many ways, frequently turning to humor and games to infuse fun into the classroom.

Anna Tucker’s Kindergarten classroom is one of three at Houghton Elementary School, located in a suburb of the large urban city where Shaun Allen works. The school is located in one of the wealthiest towns in the area, which has an average household income approaching \$100,000. The student body is more than 90% Caucasian, but the school does serve many international families. Although it is situated in a suburb, the school is easily accessible to the city – the on-ramp to a major highway sits just a two-minute drive away. Houghton is situated right in the center of a quiet, residential neighborhood, surrounded on all sides by moderately-sized homes. The gray school building is spacious in its own right, flanked by sprawling playgrounds and fields used daily by the children during recess. Mrs. Tucker and the other Kindergarten teachers have their own separate play area, fenced in and tucked to the side of the building, with easy access directly from their classrooms. Virtually every day that I visit the class, the class is given three outdoor recess sessions or “energy breaks” on this private playground. In addition, they also have at least 30 minutes of choice time daily, during which they can play anywhere in the classroom, pull out toys from home, and freely walk in and out of the cubby area where their private bathroom is located.

Over the weeks spent visiting her classroom, I observe that Mrs. Tucker's work with the students is like that of the conductor of a large orchestra. Each student plays his or her own individual instrument and the class functions as a mixed musical ensemble, exhibiting different strengths and weaknesses, levels of difficulty, and requirements for support in order to excel. The ensemble member who plays the oboe requires strong breath support and skill with circular breathing to create the proper tone with his reed. The way the standing bass player breathes is not important; instead, she must focus on supporting the physical weight of her instrument, plucking or bowing with adequate pressure, and carefully placing her fingers on the strings to produce a tone on-pitch. And the ensemble member who plays the cymbals does not need to attend to breathing or finger placements, but instead must understand the mechanics of crashing metal, including how to start and stop its vibrations in a way that is harmonious with the dynamics of the musical piece and with her fellow players. No one would expect the members of an orchestra to perfectly understand how instruments other than their own create their sound, but the maestro must understand the expression and technique of every instrument in order to collectively lead the group. In this way, Mrs. Tucker is the maestro of her class. Although the students receive the same prompt for most of their work, Mrs. Tucker attends closely to each individual learner's particular strengths and areas for improvement, holding them to their own individual standards, and adapting instruction accordingly.

Mrs. Tucker describes this year's group of students as "the most challenging class she's ever had" in all of her years of teaching. Throughout the day, she frequently shares comments with me privately about how loud or unsettled they are. Even the

administration has acknowledged how difficult it is, allowing her to have an aide for the full day on three days a week, and later expanding the time even further to include additional afternoons. Notably, in this particular year, an unusually high number of students in her class have individualized education plans (IEPs). These address a wide array of issues, including fine motor development, speech problems, anxiety, ADHD, social skills, and various academic needs. Some of the students with IEPs have charts in which they track how they are doing in each section of the day. Most receive pull-out interventions with specialists who come in and out of the classroom throughout the day and take students to another room for small group or individual teaching.

Behavior management is a big element in Mrs. Tucker's classroom, out of necessity. Over the years, she has learned effective ways to help students who have ADHD and emotional issues to improve their ability to focus in class. In addition to her direct correction – drawing to their attention that they are off task or doing something that bothers someone else – she always comes back to helping children help themselves get focused in order to learn. She frequently offers a host of options, available to everyone, to help students get re-centered and plugged into the events of the moment. She has trifold cardboard displays that the children can use as an “office” to reduce their focus on visual distractions around them, defining their own space within the classroom. Any of the children are able to grab a special cushion to sit on, a “focus tool” – a small toy that often has a repetitive movement inherent to it – or an “idea clipboard” on which to write down words and images about moment-to-moment thoughts, rather than call out and interrupt a group discussion. Mrs. Tucker allows the students to monitor themselves and swap out or make adjustments, as needed. She frequently will ask a question of a student who is

calling out or squirmy, offering a chance for self-adjustment. “What do you need?” is a common inquiry, often followed by a few suggestions. “Do you need a focus tool?” “Do you have your idea clipboard?” At this point in the year, Will, Freddy, Felix, and Russ must have an idea clipboard for meetings at the circle, but others can also get them, if they choose. These four boys each have one stored in their chair pockets, and it is their personal responsibility to get these before each session.

Mrs. Tucker often uses metaphors and visualizations to convey what is expected of the children, particularly when it comes to feedback about behavior. To get them to stay quiet in large groups, she will remind them, “Lock your lips” or “Zip it, lock it, put it in your pocket.” If something exciting happens, like winning a game they have played together, and she anticipates they’ll want to cheer, she’ll ask for a “silent squeal.” And, if a student starts chatting or calling out during a group meeting, she might remind him or her to put “words into the finger” and down onto the paper on the “idea clipboard” to share with her later.

At times, a student may move around a lot with a case of “the wiggles,” or feel “silly” and distracted, making it difficult to focus on the events in the classroom. In those instances, she may offer the child a short break. This can take the form of “take 10” – a quick break during which they go into the coatroom and run around or jog, or take deep breaths as they count to 10 – and then return to the group. Another method is telling them they can “catch a bus,” where they go into the coatroom and run around in circles to get out their energy. Russ and Will often go for a walk around the hallway with Mrs. Connor, or a class volunteer, to step outside of the classroom into a different space where they can refocus.

Although it typically does not absorb a large portion of the whole group learning time, Mrs. Tucker extends prompts multiple times a day to help trigger self-assessment and problem solving for the students to correct their own behavior using some of the available tools. This can be accomplished via a reminder of options, prompted through question-asking (e.g., “Do you need a focus tool?”). In other instances, she simply tells the students directly what to do (e.g., “Go take 10 and come back ready to focus”), or she draws the child’s attention to the behavior of peers for cues as to appropriate behavior (e.g., “They have an ‘I’m trying to focus face’ on”). The moments of correction are not always subtle but, as much as she can, Mrs. Tucker seems to try to put the agency in the student’s hand. One day, when Rory is out of sorts as they are doing their writing practice, she says to her, “I’m gonna ask you to stand up. Go look at yourself in the mirror in the bathroom, and see – do I have an ‘I’m ready to work’ face? Then come back, let me know.” I watch Rory go off on her own and she returns about a minute and a half later, better able to continue her work.

Another demonstration of correction involves Drew, a student that Mrs. Tucker describes as “so lovable,” but also “high maintenance.” She feels that some teachers, past and future, might think it easy to simply say, “This kid is a problem,” but her intent is to “stop and take the time” to offer the support he needs. During one of the class meetings, I see that Drew has positioned himself with his back turned 180 degrees from the front of the classroom, the exact opposite direction of his classmates. In response, Mrs. Tucker softly calls to him: “Drew, can you find my eyes? Would you like a cushion from under my desk?” He turns his head toward her momentarily and then his eyes again begin to drift away from her. “Hey blue eyes! Blue eyes!” she calls out to him. His head pivots

back, and he again makes eye contact with her. She smiles and asks, “Would you like a cushion?” He starts to silently shake his head left to right, indicating no, then quickly changes to bob his head up and down, indicating yes. “It’s up to you,” she says. “There’s a couple different kinds under my desk. Help yourself.” Mrs. Tucker then continues on with the class, and Drew is free to meander over to her desk in his own time, select the cushion of his liking, and bring it back over to rejoin the class with increased focus. Drew independently finds what he needs for himself, as Mrs. Tucker continues on with what she was saying.

Offers like this are extended frequently in Mrs. Tucker’s classroom. She says that she does not always want to be “giving... negative directions about what to do.” Instead, she focuses on helping the students to better understand and track themselves. “We all need to learn to take 10...they figure out that isn’t a punishment so much as ‘my body needs something right now, or my brain.’” Rather than create a big, negative moment, she allows students “to remove themselves for a minute, get it together,” while at the same time “trying to keep it seamless” with respect to the progress in the class activity or discussion. It is as if Mrs. Tucker – the conductor at the podium in front of the orchestra – makes a subtle request of the bass drum player, but allows him to resolve it himself, without specific directives on technique. She trusts that the student, with the prior experience from earlier practice, knows how to adjust for himself.

Across the average day that I am in the room, the class transitions smoothly from whole group activities or discussions into individual seatwork. The routine and structure of the class is generally very prescribed. There are a finite number of activities that the children will do in her class, and set ways of doing them that they all know by now,

within the second half of the academic year. During the work time, Mrs. Tucker gives them a “score” that maps out just what they need to do or practice. The students are often given materials to be used in specific ways: a craft for which they have to cut out a pig-shaped sheet, later threading through a thin strip of paper that slides to make various pig family words; a packet of blank pages with open space and several lines that they can use for a week or two to write sentences and draw illustrations during writing exercises; or an often-referenced card in their chair pockets that lists several common sight words.

Mrs. Tucker’s classroom has a great deal of infrastructure that affords her substantial time each day to check in with students individually and in small groups. She has an expectation that all of the students’ parents will sign up to volunteer regularly in the classroom. This means that, within that rotation, one of the students in her class has a mom or dad (and sometimes a younger sibling, too) in the room every morning of the week during the dedicated 45-minute shared reading and independent writing time. She also has a general school volunteer, who rotates around to different classrooms, and comes into her class during the same 45-minute block. Daily, Mrs. Tucker’s team includes the class aide, a parent volunteer, and the school volunteer. This means that there are commonly four adults circulating as the students work each morning, usually focused on writing and/or reading activities. Simply having more people present in the room certainly does not guarantee excellent teaching; however, when paired with Mrs. Tucker’s experience and skill in teaching and good management of the extra hands on deck, there are huge benefits to the children’s learning experience – namely, more individualized attention. Most often, the volunteers move around to check with the children as Mrs. Tucker flits about the room, moving briskly from one student to the next,

sharing a quick bit of feedback, sharing ideas about how to correct mistakes, or suggesting a next step that will help improve a skill.

I am impressed with the way that Mrs. Tucker's pleasant demeanor is somehow simultaneously serene and enthusiastic, no matter what the children do or say. Typically, her facial expression is relaxed and neutral with an occasional smile, and her eyes exude calmness. She never yells; her voice is consistently somewhere in the range of a moderate level down to a soft whisper. Somehow, she also remains animated and engaged, conveying with her words that she is paying close attention to what the students are doing and saying. I imagine this requires a great deal of self-awareness and ability to genuinely appear cool, calm, and collected, despite the frenzy within the energetic classroom.

Flexibly Interpreting the Score

Day after day, as I sit in Mrs. Tucker's class, I notice that although she is not timid about telling the students about mistakes, she rarely directly tells them they are wrong or provides them with the right answer. Instead, she demonstrates an adaptive approach to corrections. "We just try to keep everything light. The stakes are not high here." Students' mistakes prompt questions and curiosity, and she is often generous with the time she allows children to puzzle through to a guess.

Furthermore, Mrs. Tucker shares with me that, in many cases, she does not view the mistakes students make as something wrong. This sentiment ties to her focus on flexibility – a concept she references multiple times a day. Although the variety of tasks she offers is well-defined, the class is flexible with their schedule, frequently shifting and reordering to skip things they don't have time to do, and adding more time to finish other

things, as needed. Similarly, she is flexible with answers, feeling that most of her questions allow a wide spectrum of acceptable responses. “I guess in Kindergarten, I don't really think of there being a lot of errors, because I try to make Kindergarten a gray area. There's so many ways you can come at this. And there's really more outcomes than even adults think there can be.”

When students make mistakes with academic concepts – writing a letter backwards, adding two numbers together incorrectly, guessing the wrong letter sound – she tends to respond by drawing out the interaction. She will slow them down, sometimes singing “hold your horses” to prompt them to start over and take their time this go around. At other times, she will affirm the challenge: “Watch out, those rascals are trying to trick you” or “Yeah, that's such a hard word, isn't it?” When it involves mistakes related to the students’ academic learning and skill building, she makes it a point to never “sugarcoat things or ignore them or pretend they didn't happen” – she faces them head-on, in partnership with the student, supporting the student’s own inquiry about how to figure out what went wrong.

Although many answers are more black and white – $3 + 4$ always equals 7 – Mrs. Tucker uses questions to probe students’ reasoning and to process how they came to a particular answer. She protects their think time as they ponder their mistakes, and is generous in giving them credit for reasonable thinking and logic. She also wants “the kids to feel like they can ask anything.” Mrs. Tucker models this with most interactions in the classroom, demonstrating how their learning process is interactive. Even after they land on an answer, that doesn’t mean they have to stop there.

Mrs. Tucker draws attention to their mistakes, as well as her own, and she models how to take it in a positive way. She says, “I try to go out of my way to make sure the kids are feeling like, ‘It’s okay to make oopses.’ And here, I make them, too.” Many times, she will tell a child who is having a hard time dealing with the fact he or she messed up to “be flexible with yourself.” She feels that being transparent about mistakes is important to do in Kindergarten because, in her opinion, “If you can’t be taught this is a good time to make mistakes, when is it ever gonna happen, you know? It’s not like all of a sudden in third grade, ‘Okay, you can oops now’ but for four years you thought you couldn’t... I feel like now is the time.” She invests heavily in growing her students’ comfort with mistakes, building a positive classroom culture with a foundation of humor, flexibility, and emotional safety, while making substantial investments in classroom camaraderie.

While she certainly wants students to feel comfortable making mistakes, there are some clear distinctions related to whether or not and how long Mrs. Tucker and/or the class will address a given mistake. The pace of these interactions varies depending on the type of mistake. When individual students are making behavioral or social mistakes related to classroom management – e.g., calling out without raising their hands, singing or talking loudly in a disruptive manner – Mrs. Tucker tends to keep the pace of the exchange brisk, the words spoken softly, or even exchanged non-verbally, through gestures or writing.

However, in almost every other situation, Mrs. Tucker tends to draw out her response to mistakes, lengthening it with extended dialogue in which the students are actively involved. This is true in the case of individual academic correction, as well as

whole class social/behavioral redirection. If the energy of the entire class is high, she keeps a pulse on that and may even redirect the entire plan for instruction. For example, one day when the class is preparing to transition to a new activity, Mrs. Tucker looks around. I notice that several of the children are talking to each other, with their attention turned away from her. She checks in with them, reminding everyone that “if you’re in this class, it’s your responsibility, your job, to learn and let others learn. If you are not ready to learn or let others learn, I do not want you sitting with us right now.” She then prompts the students to do some internal self-reflection: “Ask yourself, ‘Am I ready to learn?’” and “Ask yourself, ‘Am I ready to let others learn?’” After giving the class a couple of moments to think about each question, she asks them, “Was there anyone who told themselves, ‘No, I’m not ready to learn?’” Immediately, Freddy’s hand shoots up. “You’re not? Okay, what do you need so you can get ready?” Freddy chooses to go to the calm corner. As he steps away from the meeting, Mrs. Tucker asks, “Is there anyone else who told themselves, ‘No, I’m not ready?’” One by one, many other hands go up.

“Can I look at a book?”

“I want to go to the cubby.”

“I feel a little silly.”

“I feel a little silly, too.”

Mrs. Tucker pauses. “I’m noticing a lot of silly. Do we need to do some kind of silly song?”

“Yeah,” the class cries out in chorus.

Mrs. Tucker holds up the book. “The book is gonna wait.” She gets the attention of the student helper and asks, “Would you like *Beanbag Rock* or a *Count Off*?” The

class momentarily abandons the original plan – reading centers – and instead takes a break to dance to the *Count Off* music track.

This moment – and many others on an almost daily basis – demonstrates how Mrs. Tucker sets a measured pace in the class, while remaining adaptive and flexible. She shapes the day’s routine based on what the students need and what, in her assessment, they are capable of doing in their present state of mind. “I really think that if kids are really tired or really excited for something, you need to go in that direction.” In this case, the students are not offering attention and are talking over her. Rather than interpret their behavior as individual mistakes to be corrected, she reads it as information about the internal state of the students and, in turn, she responds with what she feels they need – a prompt to self-assess how they are doing internally and an invitation to take a break, if they need it. As I observe this moment in the class, I can see that it is necessary, but also wonder about the extent that this is a luxury. Although any teacher can take a break, arguably the types of breaks she offers are only options for Mrs. Tucker because she is afforded close physical access to the playground and autonomy to adjust her schedule as she sees fit. It is the students who benefit from this level of adaptability. Leaning on the structures provided by their teacher, they have opportunities to take risks and play with new ideas as they are learning, and to change the pace as needed.

Supporting Individual Players to Build the Ensemble

According to Mrs. Tucker’s assessment of the students in her classroom, she has “21 sets of goals going on. I do not have one set of goals that I apply to all these kids.” And, she adds, “I just shouldn’t be a teacher, if I do.” The identification of and support for

individual standards and goals are central to her work. Because much of the seatwork in the class is done independently, she is able to circulate and quietly give feedback in a one-on-one interaction, allowing her to “keep everything on their level” as she moves from child to child to offer comments and suggestions for improvement. This is important because as she works with “the more mature or the academically more capable kids,” she wants “them to feel like there's areas that they need to work on,” but doesn’t “want the kid over here next door who's struggling with two words to even be thinking about some of this stuff.” With this approach, ideally everyone can get the feedback they need, at the level they need it.

Benjamin Zander, the conductor of the Boston Philharmonic Orchestra, once said that, “The conductor of an orchestra doesn’t make a sound. He depends on his ability to make other people powerful.” So that her students can feel empowered to exercise their current academic capabilities, Mrs. Tucker – as class conductor – invests time in helping the students adjust their expectations for themselves, so that they can thrive in their individual learning. This can mean shifting the goal of an activity down to an easier level, or pushing themselves to do something more challenging; and it varies widely from one child to another. It is important to Mrs. Tucker that the children have a sense of what they can do, and what is appropriate for them to expect of themselves. “I want them all to not care what anyone else sitting next to them is doing and just feel like they can make those mistakes.” Part of that is helping them to adjust their expectations for what they can do now, and looking ahead to goals in the future without worry of what they cannot do now. One way this manifests is in her work with them during their literacy activities. After listening to Mrs. Tucker read through a chapter or two of a book, she tells the students to

independently write sentences reflecting facts or scenes from the story. In this context, she makes several distinctions about what she expects from them. For example, she makes it clear that she does not expect them to spell things the same way that she does:

“I make a big deal about Kindergarten spelling versus grown-up spelling. And before they do something like the writing prompt ... I'll say, ‘Who's gonna write like a Kindergartener?’ And they raise their hands and then I'll say, ‘Who's gonna write like an adult?’ My aide and I will raise our hands... And I'll say, ‘You know what? I've been doing this 40 years longer than you have,’ and they're like, ‘Wow.’”

In this sense, she directly gives them permission to spell using just the skills they have, and not to worry about what it's “supposed” to look like. She just expects them to “do the Kindergarten spelling and I'm gonna do the grown up.” By framing herself as someone who has decades of experience, Mrs. Tucker is reminding them – before they even make mistakes or try out the skills they have – that they have permission to be at their current ability level; and they should not expect the same results as the teacher.

While Mrs. Tucker, in some cases, helps students to strive for more reasonable standards, she sometimes urges them to go for a more difficult challenge. A common phrase she says to students when she checks their work is “You're getting smarter and I'm getting harder.” It is reserved for moments in which a child executes a task at a lower level than she has the potential to achieve. This is an extension of her focus on individual standards because, with this feedback, she is directing individuals to choose harder things for themselves next time. When they are writing sentences on their own during writing practice, Felix's goal is to try to write the first letter sound of each word, and to correctly

represent the number of words by drawing a horizontal line for each word. He is praised for his efforts on this and she encourages him in his progress. However, when she checks Russ's paper, she asks him to do an additional sentence. Looking at his paper, she comments, "That is really working for you. Well, since you're getting smarter, I'm getting..."

"Harder," Russ replies.

"Great!" said Mrs. Tucker. "One more sentence, Mr. Smarty Brain."

At other times, she draws on her knowledge of the student's prior performance to help them re-assess their own capabilities. On a day when Rory writes a single sentence, Mrs. Tucker asks her to actually skim the prior pages of her writing notebook and take a closer look. "Look at all the sentences. Look at all this, look at all this." Mrs. Tucker flips through her notebook. "That's why I'm confused by this." She flips to the current page for today's work, revealing the one sentence Rory has written thus far. "This is a great start, but you just did a teeny tiny one today. I know how smart you are. So, you're getting smarter, I'm getting... harder."

In this class, the reward for progress and strong performance is praise and increased challenge. In these interactions, particularly with Russ and Rory, she is not seeing them match prior levels of performance, or make mistakes. "Kids are so competitive, so I'm gonna feed into that in a positive way, like 'You know what? I know how smart you are.'" While other students in the class are done with one sentence, and although Rory is encouraged in the good start to how she begins her work, she gets a clear message that the task is not complete for her because her potential is greater than what she displays on that given day.

Moments like these demonstrate that Mrs. Tucker is truly interested in promoting the students' ability to do for themselves. Making the "obvious mistakes" is a means to help them learn. "To me, those are expected, natural... That's the good mistakes to be making." As they make the good mistakes, she gives the feedback needed for them to know they made a mistake, but the space and freedom to counter back and share what they think is right. Sometimes, the answer is black and white – what is the next letter of the alphabet? What does a given letter sound like? If the student got it wrong, there is no way around it. But she tries to follow the student's logic to see how s/he landed on a particular answer.

One day, Mrs. Tucker introduces the Alphabet Sock Game (an activity that Mrs. Tucker had recently invented) to help practice letter recognition. The children form a large rectangle around the room of the meeting area, as the floor is covered with many brightly-colored footprints. Each paper has an uppercase and lowercase letter printed on it. Mrs. Tucker selects a couple of student volunteers to help her play the game. Rory and Edward are chosen – one boy and one girl. They start by looking for the letter *A*, and Mrs. Tucker and the two students shuffle over to that letter. Then, the next letter is called, and they shuffle over to that letter. In this game, there are a couple of times that Mrs. Tucker explicitly counters the student guess. They make their way through the alphabet beginning at *A* and eventually end up at *Q*.

"See if you can find it," says Mrs. Tucker. She and the students are turning around, scanning the floor for the next letter that comes after *Q*. Edward, one of her helpers, is searching fervently. "Hold on, let him think, let him think."

After searching for a few moments, Edward looks up at Mrs. Tucker and asks “*U*?” while standing on the foot-shaped foam piece.

“I disagree!” shouts Mrs. Tucker, sounding excited and happy. “This is a fantastic, wait wait...*Q*.”

“That’s a *U*!” someone exclaims energetically from the border of the rug.

“But I think that’s why he thought so,” Mrs. Tucker explains. “Because *Q* and *u* are always together. Someone, we’re stuck on *U*. Look at the alphabet?” She points up at the alphabet chart, and the class starts singing the ABC song at turbo speed, a strategy she has modeled to troubleshoot mix-ups made earlier in the game.

“*A, B, C, D, E, F, G...*” Eventually they make their way back to the end of the alphabet. “...*L, M, N, O, P, Q, Rrrrrrrrrr*”

“*R*?” Mrs. Tucker asks, verifying the next letter.

“It’s right there, it’s right there, it’s right there!” calls out Mark, jumping to his feet and pointing at the letter card. The class continues the game, making their way through to the end of the alphabet to the letter *Z*.

While there are times in which Mrs. Tucker feels that a correction is needed (i.e., *U* does not come immediately after *Q*), there are other times that Mrs. Tucker is adamant about convincing students to change their responses for themselves. This may happen through prolonged discussion and prompts to self-evaluate, and is particularly important at times when the answers are more objective. For example, the reading and writing curriculum Mrs. Tucker is required to use “want[s] kids to track” the work they are doing in the classroom and to “have a personal goal.” She decides that the task is a bit too complex and time-consuming and, because it “is just not gonna happen” as prescribed,

she decides to “tweak it” so that it will work better for her students. Every two weeks, “I come up with four work goals, four social goals,” and in small groups, she allows each child to consider and choose what they want to try to improve. The work goals can include different Kindergarten academic skills (e.g., use of capitalization and punctuation), and social goals often have to do with self-regulation and interacting with others (e.g., managing volume of own voice in the classroom).

One morning I hear her share with the class that “everyone is gonna sign up for a work goal and a social goal.” During a relaxation time, she calls over small groups of three or four children to talk about which goals are the best fit, helping them narrow things down to a smaller number of choices. Once they identify a goal that they want to take on, each child signs underneath the goal on a sheet to be publicly posted in their classroom.

Near the end of the time, after toggling between work and social goals and cycling through several small groups, it is finally Ashley’s turn. She is a small, quiet girl with long dark hair pulled back into a ponytail. She sits across from Mrs. Tucker, weighing the options as she speaks, and picks a goal.

“Calm and quiet in the coatroom. I didn’t know you were ever loud and crazy,” Mrs. Tucker says.

Ashley looks at her with a smile. Mrs. Tucker slides the paper back over toward Ashley again. “It’s up to you,” she says. “You know more than me what you need help with.” They review the options again, and Mrs. Tucker elaborates on why other goals might be a better fit.

“What about speaking up and sharing your great ideas? You've been doing that a lot lately,” she comments, implying that Ashley might already have a handle on that social skill. “You tell me.” Ashley turns her head left and right, looking across the four options placed in front of her. After a few seconds of silent thinking, Mrs. Tucker chimes back in. “Do you think it's speaking up? Not interrupting?” Mrs. Tucker wrinkles her nose and shakes her head no. “Do you agree – that’s okay already, right?” Ashley shakes her head up and down in a very gentle nod. “Do you feel like in the coatroom you get a little loud and crazy?” Mrs. Tucker looks at Ashley. She is quiet for a moment, then shakes her head left to right a few times, so gently that although I am sitting just a few feet away, I can just barely discern it as shaking her head no.

“Not so much.” Mrs. Tucker moves on. “Okay. Telling kids when you don’t like something, or speaking up? Which one did you want to work on this week?”

Ashley silently points to the page with the goal of speaking up, as she looks up at her teacher. Mrs. Tucker gives a nod and, with a quick move, plops a pencil on the table right in front of Ashley. “You have really started doing that lately. That’s a good choice.” Ashley remains silent as she leans on the table to write her name on the page, and then leaves the table.

Mrs. Tucker really likes the goals because the children get a chance to choose from “what they think is appropriate” and, fortunately, she finds that “they almost always pick what is at their level.” This is the case for Ashley, who meekly selects the goal of speaking up, although she is a shy child. Mrs. Tucker walks her through a process of considering each option, but at the end of the day, Ashley chooses for herself and signs her name below the goal. The list is later posted in the classroom for reference in the

coming days. This is an example of Mrs. Tucker's attempts to help students take on making decisions for themselves. "Even if I was sort of hoping they'd pick this one and they really want this one, if they can tell me why, then they're taking ownership, and it doesn't matter what goal *I* want that week." In life, the students won't always have someone like Mrs. Tucker conducting them as they navigate through their learning.

Center Stage: Expecting and Inspecting Solo Performances of Mistakes

Part of helping students own their learning is to work individually with them, to let them try to figure out what happened, and then allow them to self-correct. Frequently, this process happens as Mrs. Tucker is sitting with a child at a table, exchanging hushed phrases while huddled over a worksheet, pencils in hand. But, it is relatively common for her to make these one-on-one interactions public, transforming an individual student's moment of misunderstanding into a featured exposition for the whole class. This reminds me of the way that the conductor, during an orchestra performance, selects one individual to play a solo for a section of the composition, as the rest of the orchestra continues along in the background. For the player, it can be both anxiety-provoking and thrilling to be featured in front of the crowd. On more than one occasion in Mrs. Tucker's classroom, I watch her feature several students' mistakes prominently before the audience of the full class. Mrs. Tucker conjures that same sense of amazement as I watch her call attention to student mistakes, drawing all of the children's eyes from around the room squarely onto their peer's "fantastic oops." She always frames it as an opportunity and an honor for them to be a "soloist," guiding them along as they play out their mistakes for a minute or two in front of the class.

I observe one such solo performance on a morning when Mrs. Tucker is updating the schedule to reflect the day's upcoming activities. She asks for a little help from Lionel, who has been working on his letter-sound matches. Mrs. Tucker gives him a chance to practice these skills by asking him to replace the card representing the day of the week.

"Lionel, tell yourself 'I need Monday' ... *muh*." Mrs. Tucker hands Lionel a stack of white cards. "*Muh*... Monday."

As Lionel sifts through the cards, Mrs. Tucker chats with the class about the specials for the day. Then, suddenly, Lionel holds up a card toward Mrs. Tucker. His selection has the word *Wednesday* printed on it in black, hand-printed letters. "Ooooo. Nice try!" she says, pointing at him with an eyebrow raised and a slight smile on her face. "That would be an upside-down *m*." Lionel shifts the cards around quickly, placing the Monday card on top, then offers up the stack toward Mrs. Tucker.

"Yes, yes," she says to him. "Trust yourself. Fantastic." She reaches out and takes the cards from Lionel's small hands. Then, she addresses the full class. "Can I show you this really great oops Lionel just had? Totally understand this oops," she adds, sympathetically shaking her head and looking over at him. "Check it out. Really great oops." She holds the Wednesday card in her right hand and the Monday card in her left hand, with both cards facing the students. Before them, they see the words *Monday* and *Wednesday*. "Think silently in your head for a second. Why was this a great oops?"

The room pauses for a beat, then a student calls out, "Cause, cause he saw it upside down."

Mrs. Tucker makes a surprised gasp. “Wait a second!” Mrs. Tucker replies. “That looks a lot like an *M* and especially if you go like...” She turns the Monday card upside down and places it right next to the *W* on the Wednesday card. From my view, the letter shapes look just the same. “So, Lionel - fantastic oops. Nice job.”

In this moment, Mrs. Tucker gives Lionel a chance to try out something in front of the class. When he makes a “fantastic oops,” she first lets him know that he made a mistake and gives him the space to correct it. Then, after the entire process of trying, making a mistake, and self-correcting has taken place, Mrs. Tucker does a slo-mo replay of what happened in front of everyone. This includes first allowing him the chance to self-correct once he is aware of his mistake. Then, she talks about it at length, giving a sense of why this is a reasonable mistake – i.e., *M* and *W* do make the same shape; they are mirror images of each other and therefore easier to mix up. Through this play-by-play recap, she offers an opportunity for Lionel to think through his thought process, and to serve as a reminder for other students who might be likely to make similar mistakes in the future.

Another example of how Mrs. Tucker has the class correct her mistakes comes up during their daily letter-writing practice. In these sessions, the children are focusing most of their energy on their own whiteboards, drawing lines and loops to practice their letters. Mrs. Tucker is a real stickler about how they draw the letters – which lines come first, in which direction do they go. She says that she does this because “the reality is ... these kids have to be up and running and trying to do letters so quickly” and “this is the age where their pencil grip is gonna start.” As a result of these beliefs, she works hard to get them to be precise in the sequence of strokes, and they practice it every day. Sometimes

she tells them things like, “I don’t mean to be picky but I need to know that you know how to do it.” She feels that, given the expectations in first grade and beyond, this focus on writing is important. Otherwise, “if I let them make those habits now, it’s gonna be really hard to break later.”

On one particular day, after observing the students working, I watch Mrs. Tucker give a refresher on how to draw capital letters *L* and *E*. Mrs. Tucker is standing in front of the class, next to the whiteboard easel with a red marker in hand. “Okay, tell me what to do.”

“Top start, pull down.” As the students call out the directions, she touches the tip of the marker to the easel, and slides it down, making a single vertical line on the board.

“Down,” she echoes. “Do you want me to lift yet? Pull down, slide across, now lift.” She has made an uppercase *L*, and turns to face the class. “Now where?” she asks.



Someone calls out, “Up top.”

“Top start, slide across.” She draws the top line of the letter *E*. It looks like a tall rectangle with the right side missing.



From the crowd, another of Mrs. Tucker’s students calls out the next step.

“Middle start.”

“Middle start?” Her eyes widen slightly. “Okay,” she agrees, “I’ll do a middle start.” Mrs. Tucker follows the directive exactly. Without lifting, she slides her marker from the top right, down toward the middle left, leaving a diagonal trail between.



The students laugh out loud. “Noooooooo!”

“*You forgot to tell me to lift,*” sings Mrs. Tucker, making a funny face as she erases the letter with the oops. “*Try again,*” she sings. “Action! Top start, pull down...” She starts to draw as she recaps the directions.

“Lift!” someone calls out.

“Slide across,” she continues. She makes the top line again. “Now lift. Now what?” Her hand is suspended a couple of inches away from the board, her eyes are looking out at the class.

Several reply – “Top start.”

In response, she touches her pen to the whiteboard. “Mark, help me...Slide across. Thank you.” She draws the top line and pauses with her marker on the board.

“Lift,” say the students in chorus.

“Lift,” repeats a smiling Mrs. Tucker, eyes wide as she says the word. “Middle start, slide across.” She draws in the final line, leaving an uppercase *E* behind on the whiteboard. “Start like an *L*, and then you can totally do an *E*.” She snaps the marker closed and calls out “Action!” signaling that it is the students’ turn to try out the method on their own.

In this instance, Mrs. Tucker is doing this group practice intervention in response to individual mistakes she has seen while circulating in the room. She extends continuous opportunity for students to guide the process. When the students make mistakes, she does not correct them, but instead renders them in plain sight, providing a chance for them to identify the error and collectively correct it.

Mrs. Tucker frequently reminds students that learning can be difficult and that mistakes are expected. These messages are often shared in passing as students are working, and infused into the feedback she shares with them as they work. Her efforts remind me of a conductor who has previewed a musical score and gives the orchestra advance notice about a difficult part ahead; I often see Mrs. Tucker give her students a heads-up about the impending challenges inherent to the tasks they are taking on. On several occasions during the time I am in her class, she refers to the trickiness of a task when a student makes a mistake – placing the blame on the task itself rather than on the student’s ability or effort. When children make reversals while printing their letters, she is quick to praise them for the correct parts of their work, and then playfully adds – as an aside – feedback that the figure was reversed: “Turn around, you rascal *j*.” This directive for the student to tell the letter to “turn around” comes up often when kids write reversals for letters and numbers, like *j*, *D*, *3*, and *7*. When Kelsey corrects her own number sentence, Mrs. Tucker comments, “It is so easy for those rascal threes to look the other way. You have to say, ‘Turn around, you threes!’” Or, there is another time when Rory writes out an addition sentence during morning meeting. Mrs. Tucker tells her, “Two numbers are trying to trick you. Don’t let them do it.” Once Rory identifies the mistake – two reversed numeral fours – Mrs. Tucker says to her and the class, “It is so easy for those numbers to turn around.” Personifying the mistake brings levity to the feedback. Watching these interactions, it seems to me that it is not about something that Kelsey or Rory did wrong; it is about reminding them to be on the lookout for the tricks that numbers and letters play on you when you are writing.

When students are sounding out words during reading or writing, Mrs. Tucker often draws to their attention how the English language is confusing, and she highlights how the spellings are not intuitive. For instance, one day while collecting lunch orders from the class, Mrs. Tucker asks the class “How do you spell pizza?” In that interaction, she acknowledges that it looks like “*pih-zuh*,” “it sounds like *p-eeT-zuh*,” and “if I was writing it...I might’ve said...*peeeet-suh*.” In the end, she closes the discussion of the word *pizza* by telling the students that it’s spelled like “*pih-za* cause, I told you, English doesn’t make sense.”

Another time, when the class is coming up with words in the *-ot* word family (e.g., *rot*, *hot*, *cot*), Will suggests the letter *y*. Immediately, Mrs. Tucker says in front of the whole class: “This is a great, this is a fantastic oops and he is not even going to even understand why it’s an oops because English is confusing.” She makes a big deal of it, first confirming with Will that “By ‘*yot*’ you mean a boat, right?” and then asking “Do you want to know what ‘*yot*’ looks like?” The children seem curious, and again, she explains how this doesn’t make sense.

“Crazy, I don’t know who invented the English language. “‘*Yot*’...” she says, picking up a marker and starting to write on a sheet of paper. “...you’re gonna say ‘Mrs. Tucker, that has to be wrong.’ It should be wrong. But this...” she declares, turning her paper around and revealing the spelling of the word, “is what *yacht* looks like in English.”

“What?” calls out one student softly. Will is smiling, and the rest of the children remain quiet and focused on her as she continues her explanation.

“It looks like *yaa-chuh-tuh*. But for some reason they say ‘*yot*’.” Mrs. Tucker raises her hands and shrugs her shoulders, saying, “I don’t know why but for some reason, Joe Schmoe was having a bad day when he invented that word.”

In both the pizza and yacht examples, Mrs. Tucker thoroughly justifies the children’s mispronunciation, misspelling, and general confusion about the letter-sound matching as something outside of their control. They are at the mercy of decisions made by a generic “Joe Schmoe,” who came up with all of these strange spellings. By talking about what a word would sound like based on what they know of the letters and their accompanying sounds, Mrs. Tucker also makes a case to the class for why they need to learn certain snap words – also known as sight words or “watch out words” – in her classroom. At one point, she explains that they are called *snap words* “because you should know them in a snap” and they can’t be sounded out correctly applying their knowledge of letter sounds. For example, the letter *s* “is wearing a Z costume” in the word *was*; otherwise, it would be pronounced “*waah-ss*.” And if they sounded out the word *you*, it would sound like “*yaah-ooh*.” Although this conveys an expectation of having them memorized, she clarifies that this “doesn’t mean you should come to Kindergarten and already know them. It means once I teach them to you...I don’t want you to sound them out.” Actually, she says, “they don’t make sense if you sound them out” because “someone decided let’s confuse Kindergarteners and make these words look really weird.” As with the rascally letters and numbers, the blame for students’ mistakes with snap words is shifted to a distant writer of the English language, who was purposely trying to mix them up. This helps soften the blow of making mistakes, and makes the errors less personal and more pedestrian.

It is worth noting that Mrs. Tucker offers a lot of affirming words with the students, regardless of whether or not they get something right on the first try. She also takes care to point out the details of the feedback after praise. When a mistake is made, she will lead with words like “Gorgeous,” “Terrific,” “Nicely done,” “I’m impressed,” and then follow up with “One thing I’ll say is...” or “Only thing is....” Further, Mrs. Tucker frequently expresses that she is impressed with them and that they are smart, as evidenced by their attention on different tasks in their work. “I never say, ‘Right’... ‘wrong.’ ... It’s, ‘Wow!’ ‘Really good guess’ or ‘Almost’... I just want them to really feel like they can take the chances and just start to trust themselves.” Commonly in these instances, the praise is framed in a way that propels the child into the next try.

“... Whoa. Impressive, Mr. Smith. Wow! Okay, go again!”

“Don’t forget to impress me with punctuation.”

“Great, one more sentence, Mr. Smarty Brain.”

“Pat yourself on the back. I just caught you reading - I don’t want to hear any of this bologna about I can’t read. You just did it.”

There is a call to action in these celebratory moments. It is not simply about Mrs. Tucker letting them know whether or not they got something correct in the moment, but laying the groundwork for the next task. In this way, she leverages those successes as fuel to motivate her students to take a shot again the next time, to try to rise to tackle the next challenge, or to show what s/he can do on another skill. Even if there is not a response needed at that exact moment, praising the effort is an investment toward the next time that student is standing up there, nervous about sharing. It can be a reference point to encourage them to take a stab at it next time.

Also, even when they have made a mistake, she tends to acknowledge the parts of what the children said that are right. In that sense, they get partial credit for what they can do. For example, during an activity in which the children are practicing word families, she lets Kelsey get involved in pronouncing some of the roots. She is sitting in her rocking chair at the front of the class and holds up a star-shaped, blue foam flashcard, showing her the letter *o* and letter *p* that represent the *-op* family “Uh - Kelsey, let’s go to you, sweetie,” she says. “How do you say that?” Mrs. Tucker slowly holds up the card while looking at Kelsey.

“*Ohp*,” says Kelsey, pronouncing it as in the word *hope*.

“Good guess,” affirms Mrs. Tucker. “If there was a silent *e*, you’d be absolutely right.”

“*Op*,” calls out Freddy, this time pronounced as in the word *stop*.

Mrs. Tucker stretches the stack of stars in her hand toward Freddy. “Good job. The *op* family.”

In this example, Kelsey is given the opportunity to try, is offered clear feedback so that she knows she didn’t get this one correct, but also receives affirmation that she does know something relevant. The pace of the interaction is swift – and Mrs. Tucker continues giving other children chances to try. It is a moment that is positive, but the class does not dwell on Kelsey’s particular oops. This moment really illustrates another aspect of Mrs. Tucker’s perspective on mistakes – responses can differ along with circumstances. Sometimes, as in the case of Kelsey’s mispronunciation, Mrs. Tucker is swift in moving past them, keeping the discussion “in the moment, and ‘let’s move on.’ Don’t focus on them too much.” But at other times when someone makes a “fantastic

oops,” she chooses to feature mistakes, asking the whole class to look at them. I find it interesting to consider the expertise needed to know, on the fly, when each approach is warranted. These moments are almost always impromptu. And, when they do happen, she has to first identify the mistake as one worth dwelling on, then assess the child’s level of openness to being showcased, and, finally, determine the best way to guide the interaction. This is truly skillful teaching.

Listening Carefully for Off-Key Notes: Teacher & Student Checks for Mistakes

I notice that Mrs. Tucker spends a great deal of time scanning the students’ worksheets or whiteboards. She has shared with me that she is looking at both their process and their work activities, to assure that they are edging toward the understanding she wants them to have. In addition to checking the level at which they can perform, she also cares about the process of how they think and do their work. This includes her belief that the way she interacts with a child about a mistake will influence the overall class dynamics. “If someone’s having trouble in the room, how you respond to them, they’re all hyper aware of that... I do have to be very careful how I respond, then, ’cause that’s how the kids are going to figure that... You’re creating the culture of the classroom.”

Mrs. Tucker sets the tone in her classroom, taking several specific approaches to shape that classroom culture as it relates to mistakes, including frequent, close monitoring with feedback, creating opportunities for students to try again after practice, and infusing humor into the interaction. This is well-demonstrated in the sessions the class has each day to practice their letters. Just before lunch, each of the children pick up a whiteboard, a marker, and an eraser, and go to work writing the focal letters for the day. Typically,

they start their work with the aide, and are usually well into it when Mrs. Tucker enters the room. The students are spread out across the floor. They do not sit in their assigned spots, but instead, are relaxed – laying down or reclining, leaning along the wall, haphazardly spaced around the room.

When Mrs. Tucker comes over to the meeting area, she begins to check the students' formations. These moments remind me of sectional rehearsals, during which musicians are able to practice and receive targeted feedback from the maestro about how to improve as individual players. On this particular day, the students are working on lowercase *r*, *m*, and *n*. Mrs. Tucker has been watching the students; they have practiced for several minutes as she walks around the room giving individual feedback and guidance. In the middle of the practice time, she requests everyone's attention for an announcement. "I don't want to focus too much on this one, but I'm noticing some oopses."

After taking a moment to demonstrate the proper way of writing an *r* – "middle start, pull down, push around" – she turns to the mistakes she is noticing. "I want to say some great oopses I saw. I saw some of these." She draws an *r* near the top of the easel whiteboard, first drawing a vertical line, picking up her marker, then adding a small curve near the top. It is recognizable as an *r*. "That might look familiar to some of you...And then I saw some of these." She draws an *m*, making two humps by moving her pen from right to left. "Can't start on this side," she says, putting an *X* through the letter she just drew, "so it's a great try, but it's down and around, down and around..." She writes the letter *r* over and over, moving left to right, as the children join the chant. "Now, tell me what to do."

“Down and around, down and around,” the class again chants together in chorus.

Mrs. Tucker sings, “*Where do you start your letters? At the...*”

“*Top top top!*” the students sing back to her in reply.

After continuing to demonstrate the *r*, *m*, and *n*, Mrs. Tucker resumes her walk around the room, offering feedback to the students, as needed, while they are practicing their letter writing.

“Not quite what I showed you.” She stands behind Mark, puts her right hand over his, and guides his hand as she makes a letter on the board.

Looking at Edward’s work with the correctly-formed letters, she asks, “Did you have your Letter-*O*’s?”

“Russ, almost. You’re making it harder than you have to, buddy.” As she has just done with Mark, she guides Russell’s hand in hers, as she recounts the steps to form the letter properly.

“Jasmine, can I watch? Oop, oop, can you do...” She trails off into directions about how to do the letter.

As she meanders around the room talking to the children one-on-one, she makes her way over to observe Felix, who is still early in the process of learning his letters and letter sounds. He is making some progress, forming the letter in the sequence of lines the way she just demonstrated. “Aye-yai-yai, buddy. I’m so impressed.” Mrs. Tucker continues to look on as he writes again, but he does not replicate the sequence. “Felix, you had it the first time. Don’t trick yourself.” She comes closer to him, bending down to take a look at his whiteboard. She gently takes the whiteboard and marker from him, and holds his hand in hers as she models how to draw the letter. With each stroke of the

marker, their hands move in sync – with this approach, Mrs. Tucker gives Felix the physical sensation of making the letter in the proper form. After her demonstration, she leaves him to continue practice on his own. In this sense, she’s identified and made him aware of this mistake, done a kinesthetic reteach of how to do it, and left him to practice further. She steps away from Felix and continues to make her rounds.

Almost daily, the students are independently practicing their letters like this, with Mrs. Tucker’s modeling and direct feedback in real time. As she says, sings, and chants reminders to them of what she’s taught before, the interactions are followed immediately by additional practice. They have access to check in with her again when needed, but working on whiteboards allows for students to also have more control over their experience as they practice. “Once kids can admit that they’re making mistakes, I can work with them so much more.” She helps them to face those mistakes and responds with trying again, rather than with shutting down. One way this manifests is that many of their mistakes can simply be wiped away. I often observe Mrs. Tucker quickly smudge away a malformed or mistaken letter from one of the whiteboards.

Wipes the board clean. “Let’s do some of these together.”

“You go, girl.” Wipes the board clean. “Woo woo woo.”

“You’re on a roll now.” Wipes the board clean.

Whether the student has just made a mistake and needs to try again, or has just demonstrated knowing how to write it correctly, the response is to wipe away and either do it again or move on to the next learning task.

This example demonstrates one of many ways that Mrs. Tucker devotes time and effort to closely monitoring students as they work, offering specific feedback, circulating

to see what they are doing, and intervening with questions or demonstrations to nudge them toward the expectations she holds for them. At the same time, she also structures the class so that students can do a lot of self-evaluation and have the freedom to make choices for themselves. This support of student self-checks starts first by promoting the idea that everyone is doing things in his or her own way, at an individually appropriate pace. She offers space for them to “experiment on their own and realize, ‘You know what? It doesn't matter what Joe Schmoe's doing...this is what's right for me.’” This is a priority for her. It is her goal to help her students do for themselves: “Primarily, I wanna teach them to become their own little person, and I feel like the academics are so second or third in all of that.” This rises above the focus on reading and writing – being independent and self-driven is number one. She demonstrates this through both explicit messaging and interjecting when events come up in the class.

When she is giving directions to the children about picking goals, she reminds them in advance to focus on identifying something that works specifically for them. “Whatever goal is just right for you is just right for you. But I don't want to hear someone say ‘easy!’” She points to Francis, an older man who has volunteered with Mrs. Tucker for many years since his son was in her class long ago, and says, “Because maybe my friend Francis over there is thinking, that sounds kinda hard, and if someone says ‘that’s easy’ out loud, he may be thinking ‘oh no!’ They said it's easy, I should know how to do that. Whatever's right for Francis is right for Francis; whatever’s right for me is right for me.” In this moment, she encourages the students to have confidence to make a call for themselves in order to identify what best meets their needs, to avoid worrying about what others are doing, and to be discrete, so as not to discourage classmates who may be at

different levels from them, while also fostering empathy for how their friends might be feeling.

She does the same in reference to the students' knowledge of addition problems. She acknowledges that for a problem like $3 + 6 = 9$, some students may have already memorized the fact family and can recall the answer from memory, as snap math. At the same time, others in the class will still need to employ stretch math strategies, like adding together on their fingers, counting on, etc., in order to reach the solution. And in her view, "If that's snap math for you, that's fantastic. If it's not, that's okay - we can keep doing stretch math. That's okay." The point is not for everyone to do things in the exact same way, but for people to be aware of their own needs, and respectful that others' needs may be different from their own.

Having several teachers and volunteers in the room during independent writing really seems to make a big difference in providing the students with individual support for their writing. These extra adults are able to offer students private lessons that are tailored to their individual needs. This individual support and feedback helps each child in the class to get what s/he needs in order to improve their skill and perform well. During this time, Mrs. Tucker floats around, checking on one kid after the other, and although she doesn't necessarily get to all of them, they all receive some attention either from her, her classroom aide, or one of the volunteers. In addition to any checks by the teacher or volunteers, all of the students also turn to their peers to check their work. At the end of their writing time, students get a check in their "buddy box." Everybody is able to get a check in their box because a partner has checked with them to make sure they are doing things right on their work. The buddy box comes from the curriculum they use,

and dictates that “when they write, they have to be able to read to someone.” In Mrs. Tucker’s view, “It’s just sort of reminding them they need to explain it and be able to take ownership.”

Leading Great Performances, “Oopses” and All

“I make a point of telling them that oopses are great and that you just made a fantastic mistake, 'cause look what you learned... I purposely make mistakes and highlight them, so the kids will also see that that's a good thing to just try things out.”

Whether it is subtly in a hushed voice while leaning over a small table, co-examining a few lines of writing, or during the Catch My Oops game show with Bonkers, the message in Mrs. Tucker’s classroom is clear: Mistakes are meant to be seen. Mrs. Tucker believes that it is important to “always be respectful” of her students, taking care to “never address student errors in a way that's gonna embarrass them.” During my time in Mrs. Tucker’s class, I witness her repeatedly replay and analyze the “fantastic oopses” that students make. Just as the orchestra conductor references the full musical score that includes the melodies and dynamics of every instrument, Mrs. Tucker references her knowledge of every students’ abilities, and of the content she is teaching. Mrs. Tucker cheers for mistakes, thanks the students for their mistakes, and congratulates her students for making mistakes. In her work with the students, she conveys that there is both an element of good, as well as practical utility, in taking time to look closely at mistakes.

When mistakes are made, Mrs. Tucker provides feedback, but also – within that safe space – allows whatever happens to unfold naturally and in community. When

mistakes happen publicly, she takes the time to demonstrate in detail what is wrong. First, she slows the moment down, so the mistake is visible to everyone. Then they have a conversation about it; she often offers an explanation for why it makes sense that it happened. Then, she gives the person who made the mistake – or the class as a whole – the chance to pick out what is wrong for themselves. And finally, they are given a chance to correct it, followed by a reward or praise for the fact the mistake happened. In her classroom, she orchestrates the students' learning, and relies on their mistakes to keep the movement going forward. While the musicians in an orchestra play their individual parts, the conductor is monitoring the quality, timing, and timbre coming from the instruments to ensure that as a collective, the notes synthesize into a beautiful sound. I, too, experience the beauty of watching Mrs. Tucker conduct the students' learning from mistakes in her class.

Discussion

The portraits of Mr. Allen and Mrs. Tucker offer two interesting cases of teaching and learning from mistakes in context. When their teaching practices are compared side-by-side, there are a number of similarities and differences in the ways they handle mistakes that are worth noting.

First of all, both of these Kindergarten teachers are as focused as possible on providing an individualized learning experience for their students, and this is evident in their responses to mistakes. The teachers serve classrooms that reflect a wide range of student abilities, personalities, and tendencies. In both cases, I observed that they invest a great deal of time and attention in understanding each child's distinctive needs, while seeking ways to tailor and individualize work goals, as well as the tone, content, and frequency of feedback.

Neither teacher was shy about drawing attention to mistakes in their interactions with students. Frequently, Mr. Allen communicated the importance of getting things correct (e.g., saying “kiss your brain” when they impressed him with their performance). Although Mr. Allen was very supportive of students when they did not get things right, Mrs. Tucker, by comparison, tended to be more zealous in her display of mistakes. She paused the lesson to feature the “fantastic oopses” that her students made (e.g., mixing up the letters *M* and *W*). She also featured her own mistakes prominently in front of students – a practice I did not observe during my time in Mr. Allen's room. Whether asking them to identify mistakes she made on purpose during the Catch My Oops game show, or reminding them that everyone makes mistakes when she made an unintentional “oops” in

front of the class, Mrs. Tucker identified herself as the leader in making mistakes, taking it on as a personal characteristic that she hoped they would emulate.

While welcoming mistakes in their classrooms, both teachers expended a lot of energy helping students land on the right answers. They would often engage the students in open inquiry through questioning, gathering of lists, or individual work tasks; but in the end, they tended to drive toward particular outcomes. For instance, when Mr. Allen asked the four girls to identify a letter in the ABC Bingo game – a question that has a single, correct response – he would let the students guess, and discuss why that letter may or may not make a particular sound. By the end of exchanges like these, Mr. Allen and Mrs. Tucker clearly established the correct answer; and if the students were having trouble, they would add on tips and tricks to help the children remember it correctly next time. This makes sense in Kindergarten, where much of the academic work is concrete skill acquisition, and standards prompt teachers to hone foundational literacy and numeracy skills that will be an anchor for first grade and beyond. The manifestation of these outcomes varied by student according to ability, and the cognitive demands of the activity. These teachers did not necessarily steer their students toward a particular response with open-ended questions about interpreting the meaning of a story, and they were open to accepting a response that was not fully correct from an incredibly shy student who rarely contributed to group conversations.

The teachers often acknowledged that many of the facts and skills they were teaching the children were not intuitive. Mrs. Tucker drew attention to “rascal” letters that are “trying to trick you” and words like *pizza* and *yacht* that do not sound the way they look. Mr. Allen talked with his students about the fact that sight words like *was* and

the letter sounds of the vowels do not make sense, and that English is “a silly language with weird sounds.” In both cases, the teachers affirmed the struggles students had with pronunciations and sight words. They encouraged their students to use invented spelling of words in their writing – a developmentally normal practice for Kindergarten-aged children – and urged them to get words on the page, thereby helping to build up their experience with writing and confidence in themselves. In light of their detailed knowledge of each student’s ability, the teachers had high standards for their students and expected them to try their personal best. Mr. Allen requested that his students do their “*best* best work,” and Mrs. Tucker told children who worked below their skill level to challenge themselves because “you’re getting smarter and I’m getting harder.”

These portraits bring to light some of the costs of an increased focus on academic achievement. Mr. Allen was required to focus on testing a great deal during the time I was in his classroom, and he was disappointed with the extent to which it displaced one-on-one, individualized teaching. Mrs. Tucker said that she had to do testing, too, but usually squeezed it in by calling students over for quick assessments on the playground or during choice time, rather than during the time set aside for teaching. These are factors beyond the control of the teachers, and potentially have huge implications for their students, particularly when compounded year-to-year in a student’s educational experience.

When comparing these two individuals in practice, it is clear that although both teachers were resourceful, innovative, and adaptable in their work with students, differences in access to resources played a large role in determining their responses to mistakes in each classroom. In my opinion, it is clear that Mrs. Tucker and Mr. Allen

served their classes to the best of their ability, teaching in light of the affordances and constraints of their contexts. For example, because many adults were regularly working in her classroom, Mrs. Tucker's students had more frequent opportunities to receive individual feedback from her, other adults, and their peers. Mrs. Tucker and her team spent time daily circulating throughout the room to check students' work in real time. By contrast, Mr. Allen was a solo act. He operated in a workshop model and promoted skill-building in individual and small-group interventions. He was very skilled at giving rich and textured feedback, but typically, he was the only one in his classroom providing it. Constraints in time and access to other adults in the classroom varied across the two contexts, and afforded differing levels of opportunity for the practice of individualized feedback. Philosophically, they were in accord on the approach of monitoring student work and offering detailed, specific feedback as much as possible. But, in practice, the resource differences meant that Mrs. Tucker had more opportunities to give students one-on-one feedback.

Both Mr. Allen and Mrs. Tucker are kind, thoughtful, and talented master Kindergarten teachers. Mr. Allen taught from mistakes in the same way that he strummed his old, classroom guitar – refining his students' performance and making something beautiful with the humble instrument provided to him. And Mrs. Tucker was the maestro of her classroom. With ample support and resources, she daily guided her students through their learning with vigor, teaching them to manage and even celebrate their mistakes in ways that helped hone their individual skills and abilities. These two portraits help provide a view of these teachers' day-to-day lives in the classroom, and demonstrate

the high level of effort they put into teaching in general and into helping students tackle their mistakes.

Chapter 5: Conclusion

In this dissertation, I have explored a wide range of ways that Kindergarten public school teachers respond to student mistakes during classroom instruction. The interview analysis and the two narrative portraits of teachers presented here collectively offer new insights into the daily experience of learning and teaching from mistakes in Kindergarten classrooms.

In the interviews, teachers articulated their ideals and hopes about mistakes and learning, described the types of concrete actions that they typically take in response to student mistakes, and recounted salient moments their classrooms. Study 1 provided insights into the broad range of approaches Kindergarten teachers employ in their work. In Study 2, the portraits of Mr. Allen and Mrs. Tucker illustrated how specific responses to mistakes play out in real-life contexts through rich descriptions of empirical observations. Here, I will take a moment to consider the ways these two studies relate to each other. Overall, the protagonists of the portraits provide context-anchored perspectives on leveraging mistakes, and reflect the major themes that emerged from the interview study.

Theme 1: Differentiated responses to mistakes

Presently, differentiated instruction is popular in the field of education, and has been written about extensively (e.g., Tomlinson & Imbeau, 2010). Teachers in the interview study conveyed that differentiation was key in their responses to mistakes, and that they tailored them according to student attributes (e.g., personality, ability) and the

circumstance in which the mistake was made. Mrs. Tucker and Mr. Allen exemplified how this can play out in practice. For example, during the writing time in her class, Mrs. Tucker asked Felix, one of the younger students who was still learning his letter sounds, to make a line on the page to represent each word of his sentence. Felix's challenge in his writing was to try to fill in the first letter sounds of a few of the words. However, she expected more from Russ and Rory. As their performance improved, her expectations rose and she told them "you're getting smarter, so I'm getting harder," a model of one strategy to foster growth mindset with young children (Dweck, 2009). Additionally, in order to differentiate instruction, the teachers had to track student capabilities in real-time as they evolved over the course of the year. In his online spreadsheet, Mr. Allen carefully recorded each student's individual progress, maintaining a living artifact of student performance and skills – including mistakes made – as well as other information needed to best support them and help them meet Kindergarten benchmarks by the close of the year.

Theme 2: Positive, community-focused culture

In the interview study, the majority of teachers indicated that they worked hard to help the children feel comfortable making mistakes, and tried to help students view mistakes as a necessary and positive part of learning. Similarly, both Mr. Allen and Mrs. Tucker conveyed to students that mistakes are to be expected, and that everyone makes them. As stated by teachers in the interviews, the teachers in the portraits offered various forms of praise to encourage the students when they got things right; Mr. Allen frequently told children, "Kiss your brain!" and Mrs. Tucker celebrated right answers

with exclamations of “Wow!” and “Nicely done!” As described in the interview study, these two teachers also avoided any shaming or negative talk about mistakes. On the contrary, they drew attention to the challenges of the learning (e.g., Mr. Allen centered a discussion of sight words on the fact that their pronunciations do not make sense). Specifically, Mrs. Tucker spoke of working to “keep everything light” and low stakes for the students. I also observed her playfully feature students’ “fantastic oopses” on a regular basis, and communicate transparently about her own mistakes, further normalizing mistakes (e.g., Mrs. Tucker exclaimed, “I already oopsed!”).

These attributes reflect what Spychiger et al. (1998) termed an “error culture,” or the established norms that guide attitudes about and responses to mistakes in a social context, like a classroom. At the heart of the Kindergarten “error culture” is the teacher-student interpersonal relationship, which is central to learning in early childhood educational settings (Pianta, Hamre, & Stuhlman, 2003). Beyond simply knowing information about achievement and performance, the portraits illustrate the value of knowing and being known by students. The community and personal connections that Mr. Allen and Mrs. Tucker had with their students facilitated trust-building. Also, particularly in the extended classroom observations, peer interactions about feedback were clearly important and contributed to the creation of a positive space in which to make mistakes. I observed that, with increased emotional safety, the students seemed more willing to take the risk to learn (Immordino-Yang & Damasio, 2007; Tomaka, et al., 1993).

Theme 3: Students self-correct

The interviewed teachers said that they promoted student self-correction, rather than relying on direct correction from the teacher. The portraits of the teachers illustrated this. For academics, asking open-ended questions was the key means by which the teachers helped students identify their own mistakes, letting students answer for themselves without telling them what to do. For example, Mr. Allen used questions to press Olivia for the details that she would need to create a successful writing piece (e.g., What was the first thing you did?...What was the first thing you played?... What were you doing at the science museum?). Mrs. Tucker expressed that she wants “the kids to feel like they can ask anything.” She also employed the “buddy box,” which allowed students to assess themselves and each other without teacher intervention. This approach mirrors others mentioned in the interview study (i.e., check with three before me, editing checklists). For behavior, Mrs. Tucker would invite students to go to the calm corner to assess themselves, and Mr. Allen would invoke Emily Post as a reminder of how to treat others in the class. In most cases, these self-correction strategies provided students a level of autonomy that, when joined with feelings of relatedness and competence, helped motivate the students to complete the task (Ryan & Deci, 2000). In the face of mistakes, the teachers worked to propel them toward independent learning.

Theme 4: Adjust instruction

Both teachers in the portraits strove to adjust instruction based on the students’ needs, one of the key themes in the interview study. Mr. Allen displayed this when he provided daily small group instruction in the ABC Bingo group to help the four girls who

needed additional help learning their letters. And, Mrs. Tucker adjusted the goals activity from her writing curriculum, changing the frequency and simplifying the task so that the students could more easily complete it. Also, both teachers provided breaks for students when it was clear that they could not maintain focus. Mr. Allen would pull out his guitar and engage them in a song, and Mrs. Tucker would give an extra recess break outside on the playground, or turn on dance music. These attentional breaks (Davies & Parasuraman, 1982; Ariga & Lleras, 2011) allowed the students to momentarily take their minds off of the work, allowing for increased focused as instruction continued later.

Theme 5: Manage outside factors

The teachers I interviewed frequently mentioned that they felt pressure to increase Kindergarten achievement, typically from districts, administrators, and standards. In observing and interviewing Mr. Allen, I noted that clearly he was under a great deal of achievement pressure, both to meet benchmarks, and to complete myriad assessments with his students. In his case, this resulted in less time available to provide students with individualized feedback. Mrs. Tucker mentioned changes to the district-mandated writing curriculum that required greater implementation time, leaving less time for activities she preferred, like the Catch My Oops game. And, both teachers in the portraits brought up relationships with families; Mr. Allen echoed the theme of home life playing a role in the students' attitudes, focus, and responses to him in the classroom, and Mrs. Tucker encountered parental pressures for students to achieve.

Additional insights

As outlined above, the portraits vividly illustrate the teachers' overall perspectives in the interview study. At the same time, they also help advance our understanding by allowing an account of the role of mistakes in context, bringing the strategies to life beyond the teachers' brief descriptions. Beyond the five themes, there were also three key insights that did not emerge from the interview study, but were present in the portraits. One is the detailed demonstration of the ways that corrective feedback is given by teachers. Mrs. Tucker and Mr. Allen both tended to provide specific feedback, which is the ideal way to convey corrections to students (Zentall & Morris, 2010; Hattie & Timperley, 2007). Mrs. Tucker would go as far as to verbally outline the detailed logic in the "oops," breaking down for the class the steps that led to the mistake and turning it into an instructional moment. However, her response was not uniform, because at other times, she would tell the children how smart they are, which can potentially be demotivating (Zentall & Morris, 2010). This reflects the fact that the teachers employed a mix of practices to communicate feedback.

The second insight concerns the benefits of carefully studying the daily experiences of the teachers. This approach allowed for an examination of the interpersonal, micro-interactions of mistakes in a way that, with a few exceptions (e.g., Bray, 2011), has seldom been broached in the literature. Although Schleppenbach et al. (2007) reviewed actual and perceived student errors, and Santagata (2005) closely examined the "mistake-management sequences" as they unfolded, they did not qualitatively represent the emotional elements of the interaction. In this way, this new investigation offers a unique contribution to the literature.

And finally, the present literature tends to imply that American teachers shy away from facing mistakes head on (Heinze, 2005; Schleppenbach et al., 2007; Santagata, 2005). While this may be true in other contexts, it was not the case in either of these studies. Generally speaking, the Kindergarten teachers said that they are kind, but tend to be direct, in sharing their feedback with students. They invest heavily in building a culture in which mistakes are “no big deal.” This was also the case in both Mr. Allen and Mrs. Tucker’s classrooms, but the portraits did illustrate the way that outside pressures and differential access to resources can influence how the error culture develops. Notably, when compared to Mrs. Tucker, who worked in a suburban context, Mr. Allen experienced more pressure in his urban school to reach benchmarks with fewer tangible supports to help manifest these goals. These variations, even among public school Kindergarten teachers in a similar geographic region, imply that different educational contexts cannot be lumped into a single category when developing these claims. There is work to be done to look across grade levels, school types, and educational philosophies to truly understand the spectrum of ways that responses to mistakes are enacted. And, because differential access to resources influences teacher working conditions and retention (Johnson, Kraft, & Papay, 2012), and differences in the types of instruction provided all too often fall along socioeconomic lines (Anyon, 1980), this issue of feedback and responses to mistakes is an equity issue that could lead to the social reproduction of structural inequalities that span generations.

Implications

This study has the potential to impact both teaching practice and educational policy affecting students in Kindergarten, and other grade levels, as well. First, it helps to illuminate the inner workings of the "black box" of teaching, particularly around the effects of interpersonal interactions related to student mistakes in early childhood classrooms. It is with up close, careful study that we can truly begin to understand what specific aspects of teaching are most effective, and the way that mistakes impact students' learning experiences. Second, taking a close look at different classroom types illuminates differences in teacher-student interactions that warrant further investigation and could suggest important implications for policies related to issues of educational equity. And third, the central themes in the interview study and narrative of the portraits bridge the gap between research and practice by offering relatable stories to which teachers can connect their own professional work. Both portraits offer content that is accessible to the full range of constituents in schools, not just researchers with specialized training and knowledge. This research can prompt both novice and veteran teachers to build their professional error competence (Seifried & Wuttke, 2010) by engaging in meta-cognitive reflection about their own practice. This will urge the teachers to hone their craft, deepen empathy for students, and more fully understand the impact of their daily actions. It can also help provide policymakers – many of whom are quite far removed from classroom practice – a rare and detailed glimpse into the classrooms they impact with their decision-making. Much of teaching is done in isolation; these studies give a glimpse behind the classroom door in a way that unearths “invisible inequalities” (Lareau, 2002) that can and should be addressed with policy and resource

allocation. Understanding the nuance of these interactions may prompt greater allocation of staff, school supplies, and/or other materials that will enable higher quality feedback interactions for children. It also may give them pause as they mandate assessments, considering the burden it places on teachers and the manner in which it draws away from the teachers' ability to consistently provide tailored instruction for students.

Limitations

The methods of interviewing and portraiture allow for rich, in-depth representations of the work of Kindergarten teachers. That said, these studies depict the experiences of a small group of participants. While informative and helpful in broadening our understanding of this phenomenon, the findings are not broadly generalizable and are not representative of all Kindergarten teachers nor the full range of experience of the teachers involved. And, as with all portraits, the depictions of the participants in Study 2 are both idiosyncratic to the people and contexts they represent. Yet, in their specificity and detail, they relate universal themes of interpersonal connection, differentiation, and community building required to create a classroom culture in which the teachers can effectively respond to student mistakes and enhance learning.

Furthermore, these works are constructed through my lens as a researcher – as an interviewer, portraitist, analyst, and writer. I was diligent in my efforts to engage in systematic, iterative, and careful review of the data. However, I must acknowledge that, as with all forms of research and data analysis, I made methodological choices along the way. These include considerations like the process used to code the transcripts, the

software selected to track the coding, instances of mistakes tracked in my fieldnotes, and the vignettes and quotes selected to illustrate the themes. In this work, I, like all researchers, have preoccupations that draw my attention, motivate the research endeavor, and, ultimately, shape my work. This includes my life experiences as a Kindergarten teacher, as a learner, as a mother, and as a researcher; all of these are a part of what I have brought to these efforts. To address this, in both studies, I have been careful to track – in memos and fieldnotes – times when I become aware of my bias and, when relevant, to search for and share counterevidence that might balance out the strength of my claims. I do believe that if someone else were to conduct this same study with these same teachers, similar themes would emerge. At the same time, I am also sure that there would be differences in the rendering of the work, including the feature examples, wording of theme, and order of presentation.

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In closing, there are several insights for educators that can be drawn from this dissertation. One of the most powerful takeaways is simply that, in order to give great feedback in response to mistakes, teachers in Kindergarten need to know their students and, ideally, tailor their learning experiences. Personalization and individual attention require time. This can be a challenge in modern school contexts in which many teachers manage rising expectations and are under pressure to uniformly produce results with constrained resources. As many teachers in the interview study suggested, benchmarks for Kindergarten students have increased substantially in recent years and are not necessarily developmentally appropriate for every child in the classroom. Teachers want to individualize, but are often expected to get everyone up to the same level. This

research – particularly the portrait of Mr. Allen – illustrates ways that this pressure to increase results can negatively impact day-to-day interactions and the opportunities for individualized instruction. To that end, teachers are beholden to the context in which they work. If seeking to improve the ability of teachers to leverage mistakes and give great feedback to young children, both the expectations along with the supports and resources provided must be considered.

Appendix A: Interview Protocol

A. Classroom and Instructional Orientations

Thank you so much for being willing to talk with me today. Before we even jump into the topic at hand, let's just start with the basics.

- Could you please share your professional teaching background/experience?
- What have been your responsibilities in the most recent school year?
 - What subjects do you teach?
 - On a typical day, how many different students do you work with?
 - What, if any, additional positions do you hold at your school?
- Describe the primary ways you instruct students in your classroom? (For example, lecture, small group, independent work, one-on-one, etc.)
- Describe the feel or vibe of your classroom, however you interpret that.

B. Definitions of Error and Statement of Personal Beliefs on Error in the Classroom

Now I want to ask some questions about how you and your students respond to errors when they happen in the classroom during instruction.

- First, in your own words, can you briefly define the term “error”?
 - If you had to define it outside of the teaching context, how would you describe it?
- In your opinion, is there a difference between the term error and the term mistake? If so, please explain the difference.
- In your opinion, is there a difference between the term error and the term misunderstanding? If so, please explain the difference.
- Are there some typical types of student errors you frequently observe in your classroom during instruction?
- [As a teacher, what are some of the ways you can tell when a student has made an error?]
- What are some of the ways you might respond to a student error that happens in the flow of instruction?
- What, if any, factors do you consider when deciding how to respond to a particular student's error?
- If you need to address a student error in class, what do you think are the best ways to do so?
 - Are there any things you might consider if addressing an error publicly, in front of other students?
 - What might you consider if addressing an error privately, in a one-on-one instructional situation?

C. Recollections of Responses to Student Errors

Now that you've given a sense of your general thoughts on student errors in the classroom, I would like for you to recall specific interactions you've had with students about their errors.

- I want you to take a moment to remember a time you were working with a specific student or group of students and they just weren't getting it. Could you describe that situation?
 - How did you address the student's mistake?
 - How could you tell the student had made an error?
 - What type of error did the student make?
 - Could you tell me more about how the student responded to your feedback?
- Could you please share a different situation in which a student made an error or had a misunderstanding in your classroom? *(ask for at least two and up to three specific instances, depending on length of responses)*
- [What are some of the circumstances that might influence the way you respond to a particular student's error?] *Only ask if not already addressed in section B.*
 - Do you take into account a student's academic background? personality? learning preferences?

Note: If teacher is unable to recall any instances, I can offer the following prompts as relevant: Go ahead and take a moment to think quietly; It could be in any academic subject; You began to share about x experience earlier-could you tell me more about that?

D. Closing

- So, reflecting on your overall experiences with student errors, in a nutshell, how would you describe your attitude toward error in the classroom?
- And how would you describe the attitude of your students toward their own errors in the classroom?
- If you were talking with someone about to begin her first year of teaching, what advice would you give about handling/addressing student errors in the classroom?
- In what ways, if any, do you feel that factors outside of your classroom influence your outlook on student errors?
- Is there anything you'd like to add that you did not get a chance to say?
- Do you have any questions for me before we go?

References

- Ahmed, W., van der Werf, G., & Minnaert, A. (2010). Emotional experiences of students in the classroom. *European Psychologist, 15*(2), 142-151.
- Anokhin, A. P., Golosheykin, S., & Heath, A. C. (2008). Heritability of frontal brain function related to action monitoring. *Psychophysiology, 45*(4), 524-534.
- Anyon, J. (1980). Social class and the hidden curriculum of work. *Journal of Education, 162*(1), 67-92.
- Ariga, A., & Lleras, A. (2011). Brief and rare mental “breaks” keep you focused: Deactivation and reactivation of task goals preempt vigilance decrements. *Cognition, 118*(3), 439-443.
- Bandura, A., & Cervone, D. (1986). Differential engagement of self-reactive influences in cognitive motivation. *Organizational behavior and human decision processes, 38*(1), 92-113.
- Beghetto, R. A. (2009). Correlates of intellectual risk taking in elementary school science. *Journal of Research in Science Teaching, 46*(2), 210-223.
- Bereiter C & Scardamalia M (1993). *Surpassing ourselves: An inquiry into and implications of expertise*. Chicago, IL: Open Court.
- Bertsch, S., Pesta, B. J., Wiscott, R., & McDaniel, M. A. (2007). The generation effect: A meta-analytic review. *Memory & Cognition, 35*(2), 201-210.
- Black, P., & Wiliam, D. (2010). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan, 92*(1), 81-90.
- Blascovich, J., & Mendes, W. (2008). *Challenge and threat appraisal*. Handbook of approach-avoidance motivation, 432-444.
- Borasi, R. (1994). Capitalizing on errors as “springboards for inquiry”: A teaching experiment. *Journal for Research in Mathematics Education, 166*-208.
- Borko, H., & Livingston, C. (1989). Cognition and improvisation: Differences in mathematics instruction by expert and novice teachers. *American Educational Research Journal, 26*(4), 473-498.
- Bray, W. S. (2011). A collective case study of the influence of teachers' beliefs and knowledge on error-handling practices during class discussion of mathematics. *Journal for Research in Mathematics Education, 42*(1), 2-38.

- Brooker, R. J., Buss, K. A., & Dennis, T. A. (2011). Error-monitoring brain activity is associated with affective behaviors in young children. *Developmental Cognitive Neuroscience, 1*(2), 141.
- Cambone, J. (1990). Teachers and Teaching: Tipping the Balance. *Harvard Educational Review, 60*(2), 217-237.
- Charmaz, K. (2006). *Constructing grounded theory*. Sage: London.
- Chomsky, C. (1976). *Approaching reading through invented spelling*. In Otero, C. P. (Ed.). (1994). *Noam Chomsky: Critical assessments* (Vol. 5: From Artificial Intelligence to Theology: Chomsky's Impact on Contemporary Thought: Tome II). London, England: Routledge.
- Clare, L., & Jones, R. S. (2008). Errorless learning in the rehabilitation of memory impairment: a critical review. *Neuropsychology Review, 18*(1), 1-23.
- Clifford, M. M. (1991). Risk taking: Theoretical, empirical, and educational considerations. *Educational Psychologist, 26*(3-4), 263-297.
- Conroy, D. E., Coatsworth, J. D., & Kaye, M. P. (2007). Consistency of fear of failure score meanings among 8- to 18-year-old female athletes. *Educational and Psychological Measurement, 67*(2), 300-310.
- Cooney, T. J., Shealy, B. E., & Arvold, B. (1998). Conceptualizing belief structures of preservice secondary mathematics teachers. *Journal for Research in Mathematics Education, 30*6-333.
- Crone, E. A., Zanolie, K., Van Leijenhorst, L., Westenberg, P. M., & Rombouts, S. A. (2008). Neural mechanisms supporting flexible performance adjustment during development. *Cognitive, Affective, & Behavioral Neuroscience, 8*(2), 165-177.
- Davies, D. R., & Parasuraman, R. (1982). *The psychology of vigilance*. Cambridge, MA: Academic Press.
- Davies, P. L., Segalowitz, S. J., & Gavin, W. J. (2004). Development of response-monitoring ERPs in 7-to 25-year-olds. *Developmental Neuropsychology, 25*(3), 355-376.
- De Bruyn, E. E., & van den Bercken, J. H. (1982). Components of achievement motivation in young children. *International Journal of Behavioral Development, 5*(4), 467-489.
- Devinsky, O., Morrell, M. J., & Vogt, B. A. (1995). REVIEW ARTICLE Contributions of anterior cingulate cortex to behaviour. *Brain, 118*(1), 279-306.

- D'Mello, S., & Graesser, A. (2012). Dynamics of affective states during complex learning. *Learning and Instruction*, 22(2), 145-157.
- D'Mello, S., Lehman, B., Pekrun, R., & Graesser, A. (2012). Confusion can be beneficial for learning. *Learning and Instruction*, 29, 153–170.
- Donaldson Gramling (2014). Learning from and responding to mistakes: A review of the literature on young children's individual response to error. *Unpublished paper*.
- Donaldson Gramling, M. (2015). *Using mistakes to enhance learning: Kindergarten teachers' self-reported responses to student error*. Study presented at the Ethnographic and Qualitative Research Conference, Las Vegas, NV.
- Dryden-Peterson, Sarah. (2016) Listening notes: A brief guide. Retrieved from: <http://www.sarahdrydenpeterson.com/assets/uploads/pdf/Listening%20Notes%20Guide.pdf>
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: perseverance and passion for long-term goals. *Journal of personality and social psychology*, 92(6), 1087.
- Dweck, C. S., & Reppucci, N. D. (1973). Learned helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology*, 25(1), 109-116.
- Dweck, C. (2009). *Mindset: The new psychology of success*. New York, NY: Random House.
- Ellsworth, P. C., & Scherer, K. R. (2003). Appraisal processes in emotion. In *Handbook of affective sciences*, Oxford University Press.
- Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2005). *Writing ethnographic fieldnotes*. Chicago, IL: University of Chicago Press.
- Finn, B., & Metcalfe, J. (2010). Scaffolding feedback to maximize long-term error correction. *Memory & Cognition*, 38(7), 951-961.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *The American Psychologist*, 56(3), 218.
- Gazzaniga, M.S., Ivry, R.B., & Mangun, G.R. (Eds.) (2009). *Cognitive neuroscience : The biology of the mind*, 3rd edition. New York, NY: W.W. Norton .
- Geertz, C. (1973). *The interpretation of cultures: Selected essays*. Basic Books.

- Gehring, W. J., Goss, B., Coles, M. G., Meyer, D. E., & Donchin, E. (1993). A neural system for error detection and compensation. *Psychological Science*, 4(6), 385-390.
- Gehring, W. J., Himle, J., & Nisenson, L. G. (2000). Action-monitoring dysfunction in obsessive-compulsive disorder. *Psychological science*, 11(1), 1-6.
- Gentzler, A. L., Wheat, A. L., Palmer, C. A., & Burwell, R. A. (2013). Children's responses to cognitive challenge and links to self-reported rumination. *Cognition & Emotion*, 27(2), 305-317. doi:10.1080/02699931.2012.716394
- Glaser, B., & Strauss, A. (1967). *The discovery grounded theory: Strategies for qualitative inquiry*. Chicago, IL: Aldine.
- Goodwin, B., & Miller, K. (2013). Grit + Talent = Student Success. *Educational Leadership*, 71(1), 74-76.
- Graesser, A. C., & D'Mello, S. (2012). 5 Emotions During the Learning of Difficult Material. *Psychology of Learning and Motivation-Advances in Research and Theory*, 57, 183.
- Graham, S., Weintraub, N., & Berninger, V. (2001). Which manuscript letters do primary grade children write legibly? *Journal of Educational Psychology*, 93(3), 488-97.
- Harper, M., & Cole, P. (2012). Member checking: Can benefits be gained similar to group therapy? *The Qualitative Report*, 17(2), 510-517.
- Hajcak, G. (2012). What we've learned From mistakes: Insights from error-related brain activity. *Current Directions in Psychological Science*, 21(2), 101-106.
- Hajcak, G., McDonald, N., & Simons, R. F. (2004). Error-related psychophysiology and negative affect. *Brain and Cognition*, 56(2), 189-197.
- Halisch, C., & Halisch, F. (1980). Cognitive assumptions of young children's self-evaluation reactions after success and failure. *Zeitschrift Für Entwicklungspsychologie Und Pädagogische Psychologie*, 12(3), 193-212 [published in German, only abstract summary of results available in English]
- Handy, T. C. (Ed.). (2004). *Event-related potentials: A methods handbook*. Cambridge, MA: MIT Press.
- Hanna, G. L., Carrasco, M., Harbin, S. M., Nienhuis, J. K., LaRosa, C. E., Chen, P., ... & Gehring, W. J. (2012). Error-related negativity and tic history in pediatric obsessive-compulsive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51(9), 902-910.

- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81-112.
- Heinze, A. (2005). Mistake-handling activities in the mathematics classroom. *International Group for the Psychology of Mathematics Education*, 105.
- Hoffman, J. V., & Clements, R. (1984). Reading miscues and teacher verbal feedback. *The Elementary School Journal*, 84(4), 423-439.
- Holroyd, C. B., & Coles, M. G. (2002). The neural basis of human error processing: Reinforcement learning, dopamine, and the error-related negativity. *Psychological Review*, 109(4), 679.
- Huesler, B. J., & Metcalfe, J. (2012). Making related errors facilitates learning, but learners do not know it. *Memory & Cognition*, 40(4), 514-527.
- Immordino-Yang, M. H., & Damasio, A. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind, Brain, and Education*, 1(1), 3-10.
- Jamieson, J. P., Mendes, W. B., Blackstock, E., & Schmader, T. (2010). Turning the knots in your stomach into bows: Reappraising arousal improves performance on the GRE. *Journal of Experimental Social Psychology*, 46(1), 208-212.
- Johnson, S. M., Kraft, M. A., & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record*, 114(10), 1-39.
- Kang, S. H., Pashler, H., Cepeda, N. J., Rohrer, D., Carpenter, S. K., & Mozer, M. C. (2011). Does incorrect guessing impair fact learning? *Journal of Educational Psychology*, 103(1), 48.
- Kazemi, E., & Stipek, D. (2001). Promoting conceptual thinking in four upper-elementary mathematics classrooms. *The Elementary School Journal*, 102(1), 59-80.
- Kim, E. Y., Iwaki, N., Imashioya, H., Uno, H., & Fujita, T. (2007). Error-related negativity in a visual go/no-go task: Children vs. adults. *Developmental Neuropsychology*, 31(2), 181-191.
- Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-Based, experiential, and inquiry-Based Teaching. *Educational Psychologist*, 41(2), 75-86.

- Kornell, N., Hays, M. J., & Bjork, R. A. (2009). Unsuccessful retrieval attempts enhance subsequent learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 35(4), 989.
- Kuppens, P., Oravecz, Z., & Tuerlinckx, F. (2010). Feelings change: Accounting for individual differences in the temporal dynamics of affect. *Journal of personality and social psychology*, 99(6), 1042.
- Lareau, A. (2002). Invisible inequality: Social class and childrearing in black families and white families. *American Sociological Review*, 67(5), 747-776.
- Lawrence-Lightfoot, S., & Davis, J. H. (1997). *The art and science of portraiture*. San Francisco, CA: Jossey-Bass.
- Lawrence-Lightfoot, S. (1983). *The good high school: Portraits of character and culture*. New York, NY: Basic Books.
- Lazarus, R. S. (2006). Emotions and interpersonal relationships: Toward a person-centered conceptualization of emotions and coping. *Journal of Personality*, 74(1), 9-46.
- Lewis, M., Takai-Kawakami, K., Kawakami, K., & Sullivan, M. (2010). Cultural differences in emotional responses to success and failure. *International Journal of Behavioral Development*, 34(1), 53-61.
- Lehman, B., Matthews, M., D'Mello, S., & Person, N. (2008). What are you feeling? Investigating student affective states during expert human tutoring sessions. In *Intelligent Tutoring Systems* (pp. 50-59). Springer Berlin/Heidelberg.
- Lemov, D. (2010). *Teach like a champion: 49 techniques that put students on the path to college (K-12)*. San Francisco, CA: Jossey-Bass.
- Licht, B. G., & Dweck, C. S. (1984). Determinants of academic achievement: The interaction of children's achievement orientations with skill area. *Developmental Psychology*, 20(4), 628-36.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543-562.
- Mauro, R., Sato, K., & Tucker, J. (1992). The role of appraisal in human emotions: a cross-cultural study. *Journal of Personality and Social Psychology*, 62(2), 301.
- McClelland, D. C. (1958). *The importance of early learning in the formation of motives*. In J. W. Atkinson (Ed.), *Motives in fantasy, action, and society* (pp. 437-452). Princeton, NJ: Van Nostrand.

- McDonald, M. A., Bowman, M., & Brayko, K. (2013). Learning to see students: Opportunities to develop relational practices of teaching through community-based placements in teacher education. *Teachers College Record*, 115(4), p. 1-35.
- Meserole, S. K. (1999). *The effects of performance outcomes on children's reactions within different achievement goal conditions*. Northern Illinois University). ProQuest Dissertations and Theses, 0-1. Retrieved from <http://search.proquest.com.ezp-prod1.hul.harvard.edu/docview/304513937?accountid=11311>. (304513937).
- Metcalf, J., & Finn, B. (2011). Hypercorrection of high confidence errors in children. *Learning and Instruction*, 22, 253-261.
- Metcalf, J., & Kornell, N. (2007). Principles of cognitive science in education: The effects of generation, errors, and feedback. *Psychonomic Bulletin & Review*, 14(2), 225-229.
- Metcalf, J., Kornell, N., & Finn, B. (2009). Delayed versus immediate feedback in children's and adults' vocabulary learning. *Memory & Cognition*, 37(8), 1077-1087.
- Meyer, L. A., Wardrop, J. L., Hastings, C. N., & Lynn, R. L. (1993). Effects of ability and settings on Kindergartners' reading performance. *Journal of Educational Research*, 86(3).
- Meyer, A., Weinberg, A., Klein, D. N., & Hajcak, G. (2012). The development of the error-related negativity (ERN) and its relationship with anxiety: Evidence from 8 to 13 year-olds. *Developmental Cognitive Neuroscience*, 2, 152–162.
- Meyer, L. A. (1986). Strategies for Correcting Students' Wrong Responses. *The Elementary School Journal*, 87(2), 227-241.
- Miles, M.B. & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook*. Thousand Oaks, CA: Sage.
- Montessori, M. (1912). *The Montessori method*. (A.E. George, Trans.). New York, NY: Frederick A. Stokes Company.
- Nichols, A. L., Whelan, J. P., & Meyers, A. W. (1991). The effects of children's goal structures and performance feedback on mood, task choice, and task persistence. *Behavior Therapy*, 22(4), 491-503.
- Noonan, J. (2014). In here, Out there: Professional learning and the process of school Improvement. *Harvard Educational Review*, 84(2), 145-161.

- Oser, F., & Spychiger, M. (2005). *Lernen ist schmerzhaft: Zur Theorie des negativen Wissens und zur Praxis der Fehlerkultur*. Beltz.
- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, 62(3), 307-332.
- Palermo, F., Hanish, L. D., Martin, C. L., Fabes, R. A., & Reiser, M. (2007). The associations of emotion knowledge and teacher-child relationships to preschool children's school-related developmental competence. *Early Childhood Research Quarterly*, 22, 407-422.
- Pashler, H., Cepeda, N. J., Wixted, J. T., & Rohrer, D. (2005). When does feedback facilitate learning of words?. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 31(1), 3-8.
- Pashler, H., Rohrer, D., Cepeda, N. J., & Carpenter, S. K. (2007). Enhancing learning and retarding forgetting: Choices and consequences. *Psychonomic Bulletin & Review*, 14(2), 187-193.
- Pianta, R. C., Hamre, B., & Stuhlman, M. (2003). *Relationships between teachers and children*. Handbook of Psychology. Hoboken, NJ: John Wiley & Sons. (p. 199-234)
- Pianta, R. C. (2006). Standardized classroom observations from Pre-K to third grade: A mechanism for improving quality classroom experiences during the P-3 years (Discussion Paper 103). *Early Childhood Research Collaborative*.
- Raftery, J. N., & Bizer, G. Y. (2009). Negative feedback and performance: The moderating effect of emotion regulation. *Personality and Individual Differences*, 47(5), 481-486.
- Riesel, A., Weinberg, A., Moran, T., & Hajcak, G. (2013). Time course of error-potentiated startle and its relationship to error-related brain activity. *Journal of Psychophysiology*, 27(2), 51.
- Rohrer, D., & Pashler, H. (2010). Recent research on human learning challenges conventional instructional strategies. *Educational Researcher*, 39(5), 406-412.
- Rohrer, D., Taylor, K., Pashler, H., Wixted, J. T., & Cepeda, N. J. (2005). The effect of overlearning on long-term retention. *Applied Cognitive Psychology*, 19(3), 361-374.
- Roseman, I. J., Spindel, M. S., & Jose, P. E. (1990). Appraisals of emotion-eliciting events: Testing a theory of discrete emotions. *Journal of Personality and Social Psychology*, 59(5), 899.

- Ruble, D. N., Eisenberg, R., & Higgins, E. (1994). Developmental changes in achievement evaluation: Motivational implications of self-other differences. *Child Development, 65*(4), 1095-1110. doi:10.1111/1467-8624.ep7252815
- Ruble, D. N., Parsons, J. E., & Ross, J. (1976). Self-evaluative responses of children in an achievement setting. *Child Development, 47*(4), 990-997. doi:10.1111/1467-8624.ep12190904
- Rueda, M., Fan, J., McCandliss, B. D., Halparin, J. D., Gruber, D. B., Lercari, L., & Posner, M. I. (2004). Development of attentional networks in childhood. *Neuropsychologia, 42*(8), 1029.
- Rueda, M., Posner, M. I., Rothbart, M. K., & Davis-Stober, C. P. (2004). Development of the time course for processing conflict: an event-related potentials study with 4 year olds and adults. *BMC Neuroscience, 5*, 39-47.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist, 55*(1), 68.
- Rybowiak, V., Garst, H., Frese, M., & Batinic, B. (1999). Error Orientation Questionnaire (EOQ): Reliability, validity, and different language equivalence. *Journal of Organizational Behavior, 20*(4), 527-547.
- Santagata, R. (2005). Practices and beliefs in mistake-handling activities: A video study of Italian and US mathematics lessons. *Teaching and Teacher Education, 21*(5), 491-508.
- Santesso, D. L., Segalowitz, S. J., & Schmidt, L. A. (2006). Error-related electrocortical responses are enhanced in children with obsessive-compulsive behaviors. *Developmental Neuropsychology, 29*(3), 431-445.
- Scherer, K. R. (1999). On the sequential nature of appraisal processes: Indirect evidence from a recognition task. *Cognition & Emotion, 13*(6), 763-793.
- Schleppenbach, M., Flevares, L. M., Sims, L. M., & Perry, M. (2007). Teachers' responses to student mistakes in Chinese and US mathematics classrooms. *The Elementary School Journal, 108*(2), 131-147.
- Schmidt, R. A., & Bjork, R. A. (1992). New conceptualizations of practice: Common principles in three paradigms suggest new concepts for training. *Psychological Science, 3*(4), 207-217.
- Segalowitz, S. J., & Dywan, J. (2009). Individual differences and developmental change in the ERN response: implications for models of ACC function. *Psychological Research, 73*(6), 857-870.

- Seidman, I. (2012). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. New York, NY: Teachers College Press.
- Seifried, J., & Wuttke, E. (2010). Student errors: how teachers diagnose and respond to them. *Empirical Research in Vocational Education and Training*, 2(2), 147-162.
- Skibbe, L. E., Phillips, B. M., Day, S. L., Brophy-Herb, H. E., & Connor, C. M. (2012). Children's early literacy growth in relation to classmates' self-regulation. *Journal of Educational Psychology*, 104(3), 541-553.
- Smiley, P. A., & Dweck, C. S. (1994). Individual differences in achievement goals among young children. *Child Development*, 65(6), 1723-1743.
- Smith, C. A., Haynes, K. N., Lazarus, R. S., & Pope, L. K. (1993). In search of the "hot" cognitions: attributions, appraisals, and their relation to emotion. *Journal of Personality and Social Psychology*, 65(5), 916.
- Smith, C.A., & Kirby, L.D. (2009). Putting appraisal in context: Toward a relational model of appraisal and emotion. *Cognition & Emotion*, 23(7), 1352-72.
- Smith, T. A., & Kimball, D. R. (2010). Learning from feedback: Spacing and the delay-retention effect. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 36(1), 80.
- Stipek, D., Recchia, S., McClintic, S., & Lewis, M. (1992). Self-evaluation in young children. *Monographs of the Society for Research in Child Development*, i-95.
- Smiley, P. A., & Dweck, C. S. (1994). Individual differences in achievement goals among young children. *Child Development*, 65(6), 1723-1743.
- Strauss, A., & Corbin, J. (1994). Grounded theory methodology. *Handbook of Qualitative Research*, 17, 273-285.
- Steuer, G., Rosentritt-Brunn, G., & Dresel, M. (2013). Dealing with errors in mathematics classrooms: Structure and relevance of perceived error climate. *Contemporary Educational Psychology*, 38(3), 196-210.
- Taylor, S. F., Stern, E. R., & Gehring, W. J. (2007). Neural systems for error monitoring: Recent findings and theoretical perspectives. *The Neuroscientist*, 13(2), 160-172.
- Tomaka, J., Blascovich, J., Kelsey, R. M., & Leitten, C. L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of Personality and Social Psychology*, 65, 248-260.

- Tomaka, J., Blascovich, J., Kibler, J., & Ernst, J. M. (1997). Cognitive and physiological antecedents of threat and challenge appraisal. *Journal of Personality and Social Psychology*, 73(1), 63–72.
- Tomlinson, C. A., & Imbeau, M. B. (2010). *Leading and managing a differentiated classroom*. Alexandria, VA: ASCD.
- Torpey, D. C., Hajcak, G., Kim, J., Kujawa, A., & Klein, D. N. (2011). Electrocortical and behavioral measures of response monitoring in young children during a Go/No-Go task. *Developmental Psychobiology*, 54(2), 139-150.
- Torpey, D. C., Hajcak, G., & Klein, D. N. (2009). An examination of error-related brain activity and its modulation by error value in young children. *Developmental Neuropsychology*, 34(6), 749-761.
- Tulis, M. (2013). Error management behavior in classrooms: Teachers' responses to student mistakes. *Teaching and Teacher Education*, 33, 56-68.
- Turner, J. C., Thorpe, P. K., & Meyer, D. K. (1998). Students' reports of motivation and negative affect: A theoretical and empirical analysis. *Journal of Educational Psychology*, 90(4), 758-71.
- van Meel, C. S., Heslenfeld, D. J., Rommelse, N. N., Oosterlaan, J., & Sergeant, J. A. (2012). Developmental trajectories of neural mechanisms supporting conflict and error processing in middle childhood. *Developmental Neuropsychology*, 37(4), 358-378.
- Wannarka, R., & Ruhl, K. (2008). Seating arrangements that promote positive academic and behavioural outcomes: a review of empirical research. *Support for Learning*, 23(2), 89-93. doi:10.1111/j.1467-9604.2008.00375.x
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548.
- Wiersema, J. R., van der Meere, J. J., & Roeyers, H. (2007). Developmental changes in error monitoring: An event-related potential study. *Neuropsychologia*, 45(8), 1649-1657.
- Wiske, M. S. (1998). *Teaching for Understanding. Linking Research with Practice. The Jossey-Bass Education Series*. San Francisco, CA: Jossey-Bass Inc.
- Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Cambridge, MA: Harvard University Press.

- Yates, S. M. (2002). The influence of optimism and pessimism on student achievement in mathematics. *Mathematics Education Research Journal*, 14(1), 4-15.
- Zani, A., & Proverbio, A. (Eds.). (2003). *The cognitive electrophysiology of mind and brain*. San Diego, CA: Academic Press.
- Zentall, S. R., & Morris, B. J. (2010). "Good job, you're so smart": The effects of inconsistency of praise type on young children's motivation. *Journal of Experimental Child Psychology*, 107(2), 155-163.
- Zentall, S., & Morris, B. (2012). A critical eye: Praise directed toward traits increases children's eye fixations on errors and decreases motivation. *Psychonomic Bulletin & Review*, 19(6), 1073-1077. doi:10.3758/s13423-012-0294-y
- Zimmerman, B. J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. *Educational Psychologist*, 33, 73-86.
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice*, 41(2), 64-70.