Using Oximeters Heuristically: A Case for Emotionally Adaptive Pedagogy

Corinna Brathwaite

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USING OXIMETERS HEURISTICALLY: A CASE FOR EMOTIONALLY ADAPTIVE PEDAGOGY

by

CORINNA BRATHWAITE

A dissertation submitted to the Graduate Faculty in Urban Education
in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

2019
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By

Corinna Brathwaite

This manuscript has been read and accepted for the Graduate Faculty in Urban Education in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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ABSTRACT

Using Oximeters Heuristically: A Case for Emotionally Adaptive Pedagogy

by

Corinna Brathwaite

Advisor: Konstantinos Alexakos

Part of teaching a learner includes the emotions of the teachers and learners, as emotional experiences arise throughout teaching | learning that can be better addressed and coped with. The Sheffer stroke (|) is used to emphasize that teaching and learning are both simultaneous and dependent on the social interaction of learning as both the roles, teacher and learner, are interchangeable. Emotional experiences of teachers and learners impact their emotional state of being. Reflective tools such as heuristics, emotion diaries, clickers, cogenerative dialogues, and oximeters have been used alongside video recordings to prompt awareness of experienced emotions. When educators intentionally discuss and practice awareness, being mindfully aware of our emotions while teaching | learning, a “safe” academic space is developed where teaching | learning fosters ways of tackling difficult conversations and tasks (Alexakos et al., 2016). In such a space, there is room for discussion regarding the
impact of experienced emotions, or lack thereof, in an effort to address and cope with these emotions, offering a healthy choice between accepting or letting go of them.

The research presented in this thesis combines three investigations exploring physiological responses to emotional experiences in the classroom revealed through heart rate readings. The first investigation was of Petra who was wearing a finger pulse oximeter while co-presenting on gender and education in a 2012 Science Methods Education course during the Spring Semester at CUNY Brooklyn College that Konstantinos Alexakos taught. The second investigation was of Leah, Matt, and Christian wearing finger pulse oximeters while presenting on race and education in a 2015 Science Methods Education course during Spring Semester at CUNY Brooklyn College that Alexakos taught. The third investigation was of myself and Alexakos wearing finger pulse oximeters as he taught on Veterans Day in 2014 at The CUNY Graduate Center. Events emerging during each of the investigations revealed contradictions between what was normal or constant for the participants during interactions in learning environments (Tobin, 2009).

This research comprises both data and reflections through the use of finger pulse oximeters and cogenerative dialogues. The narratives and voices of the participants highlight the
physiological expression and the awareness of the emotional experience.

During this research, the need for uniting the body of work investigating emotional state of being in teaching | learning became evident. Ontologies were challenged as the very nature of one’s being was questioned through the experience of tackling something that the self considers a challenge while bringing awareness to all participants and researchers involved based on observed events. Emerging from this work and expanding Tobin’s work (2009; 2015) and that of others on researching emotions with respect to teaching | learning using heuristics and then oximeters, three themes—bringing awareness, transformative knowledge, and making cases for emotional experiences in teaching and learning—underpin and strengthen the argument for the development of a theoretical framework for emotionally adaptive pedagogy. My fifth chapter discusses such a pedagogy and the need for a theoretical framework that addresses research in emotional adaptivity of teachers and learners. In my sixth and closing chapter, I look back and reflect on this research, what I have learned and how it has changed me.
ACKNOWLEDGMENTS

My ‘doctoral journey’ has granted me the opportunity to grow beyond my biggest expectations. At the beginning of this program, I intended to apply my knowledge of pedagogy by expanding on research on curriculum reform. While that is an amazing way to go, my journey has taken me in a new direction. As I went through the program, I was challenged by my professors into thinking beyond the explicit curriculum. With the support of Kenneth Tobin and Konstantinos Alexakos, I was challenged to think about the hidden curriculum on a physiological level. Tobin and Alexakos were investigating emotions in teaching | learning. The Sheffer strokes are used to show the dialogic or codependent and simultaneous relationship of teaching and learning within social interactions. I was inspired by this research because of my experiences both as a teacher and student.

There were moments of doubt and moments where I was unsure of myself throughout the program. Beginning with my advisor, the support I continued to receive helped me grow in this journey and in writing this body of research; I offer my infinite thanks and gratitude. Finding my dissertation advisor, Alexakos, helped me begin to pave my way through this journey. He really looked for a way to allow my voice to come through in my understanding of this work. I am supremely thankful for his guidance, the support, the refocusing, and the unconditional compassion. Thank you for all
you have taught me, for your work on emotional state of being, for leading the research squad, and for being my dissertation advisor.

To Tobin, besides pointing me toward Alexakos, I am thankful for your support throughout my doctoral journey as well. The amount of knowledge you imparted through your work on emotional state of being in teaching and learning has guided me in shaping my own ontology in this investigation. I am grateful for your frustration with deterministic research in education. Thank you for supporting me and joining my dissertation committee.

To Gillian Bayne, thank you for joining my dissertation committee. Your work too has helped me gather my understanding of Joe Kincheloe’s work and cogenerative dialogues.

To Wladina Antoine Alexakos, thank you for taking the time to speak with me about my work on your personal time. Your questions about my work have challenged me to think about is the reason I want to move forward with this research.

To Arnau Amat, thank you for agreeing to collaborate on heartrate synchrony amongst three co-presenters. Learning how to co-author a body of research allowed me to experience the process of getting published firsthand. Setting up the computer and analyzing the data together showed true cooperation and flexibility as I was also conducting research in another classroom with Shequana during the same semester. Thank you for conducting the cogenerative dialogues and recording them so that I was still
a part of the research process (Amat et al., 2016). You are a great research colleague and now a great friend. The Cultural Studies of Science Education journal published our chapter as the third issue of the eleventh volume published in 2016 from pages 785 to 801, which can be found on SpringerLink.

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While I have had the pleasure of being supported by my dissertation committee, all of this would never have happened without the love and support of my mother. Before I even applied for the program, I spoke about it thoroughly with my mother. From the moment of my conception, my mother has truly supported all of my interests that could positively benefit my life and my future. Her faith in God has instilled in me the faith that I continue to develop and improve upon today. Any moment I felt I had writer’s block and even any moment I was writing, my mother was praying for me for guidance, focus, and inspiration. She gave me a harder push in the moments I truly doubted myself. Mother, you never give up
on me, you never let me settle, and you truly believe in my potential. Thank you is not enough, but it is the least I can offer to my mother.

To my loving husband, I was very independent when we began dating. I knew you were my other half, and it was confirmed when I felt comfortable sharing my writing with you during my second exam. It was such a vulnerable moment, but I felt comforted and inspired by your interest in my research proposal. You encourage me to make sure I am thorough in my writing, and proud of my own work. It is a hard discussion to have, but you face the difficult conversations with just as much ease as the easy conversations. Thank you is not enough, and I am very blessed to shine by your side.

To my son, as soon as you are able to read this, you are my motivation. I was struggling with my thoughts and my writing before I was pregnant with you. My mind was literally everywhere throughout my pregnancy. Once you were born, your presence in my life motivated me to continue in my doctoral journey. I vowed to complete my work because I believe in finishing what I have started, and I trust that you can and will too. The way you and your maternal grandmother have supported me, I will support you for the rest of your life.
DEDICATION

To my loving husband Henderson, my son Jesiah, my mother Yolanda, and my extended family, you are my motivation to keep progressing in my endeavors as an educator. Your hope continues to instill in me courage and strength. Thank God you are in my life.
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1. Investigating Emotional Experiences in Teaching | Learning Using Finger Pulse Oximeters

Teaching | Learning is a social activity that evokes an emotional experience and exchange based on the ontology of the involved participants. The Sheffer Stroke, or vertical bar (|), is used to highlight the simultaneous and codependent relationship between teaching and learning (Tobin, 2015). Interaction ritual chain (IRC), as Collins (2004) defined, comprises of the self and the other where emotion can be stimulated or evoked and shared among the participants depending on the sense of solidarity. The emotional experience comes from the IRC. Emotional experiences can be physically expressed, visible to the other, or physiologically expressed, unnoticed by the other. Emotional experiences are emotions that arise within IRCs, made visible through physiological reactions that are categorized as emotions based on what has occurred in the past under similar circumstances.

Teaching | Learning can be provocative, spontaneous, and emotional. Paul Ekman (1999) identified six basic emotions: anger, disgust, fear, sadness, happiness, and surprise. There are subcategories for these emotions as well, for example, anxiety is a subcategory of fear. Frazzetto (2014) offered a clear explanation of anxiety being even the slightest bit of anticipation of all of possibilities of mishaps causing worry to the point of fear. This is about success versus failure. Anxiety is that anticipation and
concern of failing. Frazzetto (2014) wrote about love and how society has made it a norm to be fearful of taking chances, of failure, of rejection, addressing how it has become a norm to want to calculate love. A learning environment is often expected to have a “safe” space where participants feel secure to express their thoughts, values, and ideas without having others’ thoughts, values, and ideas influencing them. Thoughts, values, and ideas that are shared can cause conflict for members in the classroom; Konstantinos Alexakos questioned whether “safe” spaces can protect all participating members that is both teachers and learners (Alexakos, 2015). Gayle, Cortez, and Preiss (2013) used the phrase academic safe space to describe a learning environment where the goal is to allow all students to share their perspectives, challenging the central ideas expressed. Alexakos and Pride’s thorny issues (2016) are issues that are tense discussions that can be riddled with emotion, with learning as the outcome. Alexakos argued that “safe” spaces rely on the teacher’s knowledge of the values, beliefs, and ideals of all students and factor in structures of power, culture, and identity which might not be easily discovered and calls into question what a “safe” space even is (Alexakos, 2015). “Safe” spaces invite students to share their vulnerabilities and their values, beliefs, and ideals regardless of their alignment with the central themes expressed. Teachers are called to offer an academic “safe” space that will tackle or
challenge majority or central beliefs discussed in learning environments. These tense discussions held in academic “safe” spaces engender disagreements and can arouse emotional experiences. My journey in research led me to reflect on some of my emotional experiences as a student, teacher, and researcher in academic “safe” spaces.

This chapter describes my own emotional journey as a student, teacher, and researcher. Beginning with my investigation of Petra’s emotional experience in Alexakos’ Spring 2012 class in Brooklyn College where she co-presented on gender and education, I reflected on my own anxious emotional experiences as a student, teacher, and researcher. Petra was a graduate student co-presenting. This class was intended to teach and discuss science methods for pre-service and in-service teachers where the core objective centered on student-led presentations and peer discussions surrounding thorny issues. Alexakos and Pride describe thorny issues as difficult, tense conversations that might arise in a learning environment and bring about emotional experiences (Alexakos et al., 2016).

While leading a discussion on gender and education, Petra wore a finger pulse oximeter that would read how fast her heart was beating, the strength of her heart, and her blood oxygen. Petra’s anxiety was revealed through her heartrate immediately before she started speaking, and my journey as a researcher changed direction to focus upon emotional experiences in teaching |
learning. In my research, the relationship between emotional experiences and physiological expressions became the focus of my investigations. Teachers are often concerned about the emotions in the classroom (theirs and those of their students) and try to manage or even eliminate them to maintain what they believe is a proper academic space. My research captured emotional experiences as they emerged during thorny issues. This chapter will explore my own anxious emotional experiences as a student, teacher, and researcher, my experience with a finger pulse oximeter. This research along with my other work on emotions presented in this thesis, builds upon previous work on teaching learning and emotions (Tobin, 2009; Tobin, 2015) and has become the basis for my advocating for an Emotionally Adaptive Pedagogy theoretical framework in the last chapter.

A Little on My Anxiety

Throughout my childhood, I was very shy to speak in front of peers, teachers, and in any public forum. In society, it is acceptable to feel shy, and it is often considered normal behavior, otherwise known as habitus (Roth, Lawless, & Tobin, 2000). My shyness affected my schoolwork when it came to presentations being assigned whether they involved individual or group work. Throughout my schooling experiences, I got countless opportunities to present or “share out” what I had learned in as many creative ways as granted by my teacher.
The pressure resulting from such anxieties was overwhelming, but I depended on a few ways to help myself cope with both presenting and speaking in front of people. I teach a remedial mathematics course and have to speak to students on a daily basis. The environment I teach in is comprised of students who have failed or opted to fail a mathematics placement test. Opting to fail a math test refers to my description of students who were overwhelmed by the experience of taking a test and chose to either not complete the test or merely chose any answer, knowing that it may not reflect well for them. Teaching in a pre-college program for remedial mathematics has enlightened me to look more closely at emotional experiences related to teaching | learning that develop over time and the effects such experiences have on teaching | learning.

The greatest sign of success, for me, on the part of the students is when they actually come to learn from the first day of school as adults. Whenever I have taught a new class with new students in front of me, I have reflected on my past emotional experiences. Reflecting on my own experiences helped me understand what some students could be going through when preparing for their first day in my class and helped me develop as a researcher and emotionally adaptive pedagogue.
In the home.

As I was an only child, my mother would observe me. She felt that she should ensure that I would be ready for the real world. What is the real world? I have not yet fully answered this, but my mother made it her business to prepare me with the necessary armor that I would need to take on whatever and whomever I faced in this real world. As I grew up, my mother involved me in a lot of socially engaging activities such as going to summer camps after school, visiting family members, spending nights with friends, going to parties, and involving myself in church activities. These activities were fun and helped me come out of my shell.

The first nervous moment in public that I can clearly remember was when my mother had me participate in a Honduran event celebrating our Patron Saint, La Virgen Suyapa. I looked dolled up with red lipstick to match the puffiest red dress my mother could find and my natural hair done up in a nice ponytail. I used to call these kinds of dresses “poofy”, and my favorite thing was to spin around making them go up, the ruffles bouncing and flaring out, making me fall. I enjoyed falling because the excessive amount of ruffles would make it feel like falling on a pillow. Then, the moment came for the show to begin. I was to walk down the center aisle with an escort around my age—I believe I was about seven years old—and my body was trembling and I could hear my heart pounding. It was more than just the fact that I was walking in
front of a whole bunch of strangers. The spotlight was on us—the children—and we were about to do a choreographed dance in which my escort would soon ask me to dance with him as would the other boys to their female partners. The moment came. I finally made it up to the front with my escort. I stood there as the music started to pick up pace. The boy bowed, put out his hand to me and asked me if he could have this dance. I looked at him, breathing heavily and shaking my head “No”. I am sure he felt embarrassed but I was petrified. I looked at my mother who was encouraging me to dance. I tried to dance but then another song came on. I thought to myself questioningly, “When is this going to end?” I ran from the little boy and flew right into my mother’s protective arms. The night went on with me watching my mother dance as I refused to set foot on the dance floor.

In school.

I enjoyed school and church. I went to public school for second to fourth grades and then returned to Catholic school. I thought these were amazing places with the smartest people. I just wanted to learn everything. I saw myself as someone who needed to take in the knowledge. I would hesitate to speak unless I was confident about my knowledge on the topic of the day. In the beginning, I was even nervous to ask questions. Besides, the other half of the battle emerged when I realized that if I spoke too much in class then the other students would label me “Ms. Know-It-All”,

7
“Teacher’s Pet”, and “Smarty Pants”. Irrespective of the type of school, students are students. Despite this, I loved being in school. Of course, I did not appreciate the teasing and bullying that would come along, but I still enjoyed being in the classroom. The worst moments for me throughout the year were the night before the first day of school, the night before a presentation, and the moment immediately before I would convince myself to raise my hand to say something in school.

The Night before the First Day of School

As a student.

As far as I can remember, the night before the First Day of school was a complete nightmare. Looking back, I think I was catastrophizing—learned that word in a session—the “First Day” ordeal but it was a truly fearful moment. The entire idea of meeting people I would rather not want to meet was horrifying. It was almost a mantra of “New Year, New You.” Even if I probably knew most of the potential classmates from the prior year or knew at least one person (when I was switching schools), I dreaded seeing anyone again. Who exactly were these people going to be this year? Who was I going to be this year? I feared being phony, misunderstood, and teased all over again for whatever differences I might have with anyone.

The night before, sleep would be my enemy although my eyes were its only ally as they would try to stay closed. My mind would
be racing. I would try to think about every possible scenario and interaction planning a response to any verbal attack in order to keep standing tall and safe. I was trying to protect myself without actually being threatened. It is hard to imagine but I would be planning for a day I had no clue about and without reason to feel it would go wrong. I would start to tremble, my heart would start to race, my pillows would all of a sudden feel like cinder blocks, and trying to watch television to save me from myself would only result in me having only about two to four hours of sleep. Upon arriving to the school, I would feel panicked and look left and right to locate escape routes to save me from the dreaded First Day of school. In addition, I felt that I needed to stay because I did not want to let the teachers down. I wanted my teachers to know that I wanted to learn even if I did not actually say it to them. Once at the school, everyone whom I considered important would be very excited to see me, and I would forget the nightmare and all my plans from the night before. Once I would reach school, everything would be fine. I would manage to laugh and become part of a clique at some point in the day every time.

Presentations.

Oh, man! I would say the worst experience I ever had presenting was in high school. I went to an all-girl Catholic high school in my neighborhood. When we were informed in my English Regents class that we would need to learn and recite from memory the Gettysburg
Address, I immediately approached my teacher after class to ask her if there was another way. I knew I would have serious issues speaking in front of my peers. I have absolutely no clue whether she thought I was kidding, but she was not having it. I was to recite the Gettysburg Address to the whole class. Knowing this, I went home every night to study the Gettysburg Address. I even had my mother test me on it. My mother was trying throughout to help me talk my teacher into some alternate route of showing her that I could do the assignment. Nothing worked. My teacher was firm and unmoved. I was ready. I stood in front of ten girls—the class was small. I walked to the front and faced my classmates. Oh, crap! I looked at all of their faces. My knees almost left me but I tried to remain standing. I took three long, slow deep breaths. I started, "Four score and seven years ago." I forgot everything including my name. I looked at the teacher with tears in my eyes. She simply said, "You get an F." I was mortified. All the air in and around me left me. It was my final class of the day. I was sixteen years old. As soon as the bell rang, I packed all my things and ran eleven long blocks to my mother’s job. I was hyperventilating and it startled my mother. She asked me what the matter was after making me drink some water. I was finally able to find the words to say all that had occurred although I talked quite rapidly. My mother immediately called the school to talk to the teacher and explain to her what happened and a possible solution
that could help my ‘F’ go away. I was beyond excited to know that my grade could change only to find out that I was to recite the Gettysburg address the next day while she proctored detention. That night was a very difficult night of sleep. I am unable to state how many hours I lay awake as my mind does not even want to think about it now. All I remember is that when detention came the next day, and I did not even remember what else I learned that day, I went to say the Gettysburg Address and almost started to draw a blank again and almost passed out. She caught me this time and asked me to say it to her at the door as she had to hold detention. I said the whole speech with ease. I cannot even tell you what the words are now. I felt tremendous amount of relief from saying it, and I completely erased that speech from my mind in order to erase that experience. I still remember that experience to this day even though I have completely forgotten the speech.

As a Teacher.

The “First Day of school” is still a struggle, but I no longer have nightmares the previous night. I drink chamomile tea and I actually stay up the night before so that I am completely tired on the night before the First Day of school. When I worked in a public school, I hated the professional development days before the First Day of school. Learning that I had to deal with that and other teachers, whether veteran teachers, first time teachers, or transfer teachers, talk about their experiences and expectations
overwhelmed me a great deal. I was extremely busy trying to practice not smiling, trying to make the room look presentable for middle-school aged children who probably were taller than me and probably more developed than I was. Hanging over my head was the fact that I knew that I looked more like a student than a teacher. The security guards would not even let me in the building until they started recognizing me. Students would escort me into the building if they knew I was a teacher which meant more work for me to demand respect in my own classroom as I still looked like a child. I really cannot tell you how I got through this but I did.

I now teach adults remedial mathematics and find comfort in the same because I know what it is like to lose nights of sleep worrying about something. I know what it is like preparing for failure. I know what it is like thinking you have to fight before you even start the journey which in the case of my students was tackling this subject head on. People are shocked that I can actually teach and speak to my students. I knew I would have some trouble with my nervousness so I took a public speaking class in college as I prepared myself to be a teacher. To get the jitters out, I say something outlandish which makes them laugh. Although not a part of the plan, the students end up feeling more comfortable because of this and the class ends up going okay for them. They even recommend my class to their friends. I feel shocked, and I always tell them that I am actually very shy. They
do not believe me but as they get to know me they realize that it is actually true.

**Working with finger-pulse oximeters?**

When I first started attending The Graduate Center, I was interested in the more political aspect of how standardization reform specifically influences the teaching of mathematics. I was very interested in focusing on the implementation practices and/or lack thereof. While ongoing research is necessary in teaching and learning mathematics within categories such as teacher qualification, assessment, teacher evaluations, standardization reforms, and school culture, emotions regarding teaching and learning became my area of interest.

For me, it all started with a presentation from another doctoral classmate, Andre, and his experience doing research as part of a 2012 study in a Science Educator course at Brooklyn College (CUNY) involving finger-pulse oximeters that Konstantinos Alexakos was teaching. The researchers in that class, Tobin, Alexakos and a number of doctoral and graduate students used finger-pulse oximeters, video recorders, cogenerative dialogues, and clickers as part of their research on emotions. Andre described the capacity in which this research study had used oximeters as well as his own personal use of them. Finger-pulse oximeters read the heart rate (HR), heartbeat strength (PLETHY), and blood oxygenation (SPO₂). At the time, I thought that Andre’s work on
oximeters and facial recognition was amazing, and I hoped to do just as well in my research on standardization reform. After taking a quantitative research course, I really felt connected with using descriptive statistics in my research. I remember visiting Tobin, who was already in a meeting with Alexakos, to discuss potentially changing my research interest so that I could use descriptive statistics in my research. They both suggested that I would probably want to look at oximeter data as the readings were loaded into an Excel file using a Bluetooth connection. Not knowing much about oximeters, I felt it was more for medical use and would be pointless for me as a mathematics teacher. I left with a few oximeters to get myself acquainted with them, worked with Andre to learn how to connect oximeters to the computer, and began to wear oximeters myself. I also left Tobin’s office with the week 5 data of their 2012 study. Alexakos too became my dissertation chair.

To learn more about oximeters, I started wearing one myself. I would wear it during daily routines which included me teaching and me attending doctoral classes as a student. I learned that when I was anxious, my HR would go up, and when I was angry, my HR would go down. It surprised me because I thought being angry would also cause my HR to rise. Before wearing the oximeter, I never paid attention to my heart rate. While wearing the oximeter, I found that when I was angry, I was not breathing regularly; I would hold my breath. When I was nervous, my breathing would speed up,
often indicating I was hyperventilating. I also became interested in researching anxiety because there are times people are nervous but their appearance does not suggest so. I have had teachers, classmates, and students tell me that I did not look nervous. Although these emotions are more easily recognizable through physiological expressions in the face, gestures, and tone and pitch in the voice, I became more curious about investigating the relationship between what happened internally—more specifically, to the heart rates—and the emotional experiences.

For my research, I observed only the heart rates of the oximeter wearer. When I wore the oximeter myself while teaching, I found that being very excited or passionate about what I was trying to convey to the students, be it a new topic or something connected to math they found interesting (i.e., celebrities, money, etc.), my heart rate would increase. It would lessen for me when I was stunned, sad, or upset. It is inconclusive for me to say that this is the case for all teachers, but what it highlighted for me is that perhaps there are narratives to express regarding emotional experiences in the classroom.

**How does the finger pulse oximeter work?**

Finger pulse oximeters are devices you can wear on your wrist and finger to keep track of the heartrate (HR), strength of heartbeat (PLETHY), and blood oxygen (SPO₂). The oximeters are connected using the program of the oximeter developer, in this case NONIN,
to be able to collect the three types of heart readings via Bluetooth on the computer. After the Wi-Fi and Bluetooth are turned on, one needs to check the drivers for the NONIN device. A message prompt will appear with a code to pair the device(s) with the computer with a six-digit number found on the back of each device. Once it is paired, one has to make sure that the NONIN program launches and the device is signaling that it is connected. There are a few more steps to select the device one wants the NONIN program to read; it will ask about how the device is to be set up and coded or it can be left on its default setting. While this is happening, the Bluetooth version is already collecting PLETHY data for potential events for investigative purposes and can be saved after it is downloaded from the device.

There are two types of data files that can be received from NONIN software. One type is an excel file (.CSV) that allows one to view 25 frames per second and three recordings of data per frame. Depending on the version of the oximeter being used for the research and how it is set up, the data is distributed along five categories called BYTE 1, BYTE 2, BYTE 3, BYTE 4, and BYTE 5. The product manual details the settings for each type of this file because the BYTE type might collect a different type of reading and value codes for missing data/error and for what is considered normal ranges for adults. The second type is a short data file (.PDF) as shown in Figure 1.1, which reveals events that came up
during the time the wearer had the oximeter on. Before one even gets to the file, they are prompted to provide identifiable information on the wearer which is labeled as patient on the file: name, height, weight, age, birthdate, and gender. The body mass index (BMI) is also generated by the software. Within this type of file, the software is programmed to identify pulse events based on pulse derived from PLETHY. Adults’ normal HR is between 70 and 100 beats per minute (bpm) and SPO$_2$ is between 97 and 99. An SPO$_2$ of 100 signifies that no oxygen is detected in the blood.
Figure 1.1 Nonin Data File Naming SPO2 Events
Leading to a Theoretical Framework for Emotionally Adaptive Pedagogy (EAP)

Oximeter readings are mostly used in analyzing cardiovascular health and wellness in medical sciences. Davidson has addressed the lack of research discussing cardiovascular wellness and emotional wellness (Davidson, 2004). Grounding oximeter analyses in hermeneutic phenomenology, event-oriented inquiry, and social cognitive theory, and research on emotions in teaching | learning allows one to investigate the physiological responses to emotions while also considering the heartrate. Tobin started working with oximeters in Alexakos’ class in 2012 to observe emotional wellness (Alexakos, 2015).

With my own personal struggle with meditation, it was difficult for me to recognize and understand the benefit of using oximeters in the classroom. As I wore the oximeter more frequently, I found myself reflecting on how my students could benefit from a more emotion-focused curriculum. Students tend to drag themselves into my classroom. Later in the semester, I would hear students openly admitting that they almost dropped the class before the first session. Their perception of who they expected me to be was nightmarish and full of anxiety. In this dissertation, I investigate a student’s inner turmoil before speaking to the class, synchrony amongst three co-presenters, synchrony between myself
and my professor in our class on a Veteran’s Day, and the case for Emotionally Adaptive Pedagogy (EAP).

In Chapter 2, I discuss the heart rate readings of a student presenter collected using an oximeter to investigate her emotions in a classroom and capture her physiological state during her presentation with her co-presenters. With her reflection provided during her two cogenerative dialogues, one with Professor Alexakos and another with a student researcher, there was more perspective and understanding of her experience about her awareness of her emotional state during the presentation. Using event-oriented inquiry, this event was selected because of the increase in her heartrate sixty seconds prior to the moment she began speaking on her presentation topic—gender. A combination of video recordings, oximeter readings and analyses, and cogenerative dialogues aid in investigating the possible relationship between emotions, awareness, and heartrate. Chapter 2 discusses the relationship between awareness of experienced emotions even when it is not clearly visible through facial expression, gestures, or tone. This research prompted me to reflect upon conversations in the classroom regarding ways to present and cope with anxiety or nervousness on an academic level.

Chapter 3 presents the research I conducted in Alexakos’s class in the spring of 2015 with Arnau Amat, a colleague visiting from Universitat de Vic-Universitat Central de Catalunya in Spain.
We were observing a presentation on race while each of the presenters wore finger pulse oximeters. Our interest in synchrony and asynchrony regarding emotional contagion led to continued discussion about difficult conversations in teaching and learning that can become traumatic emotional experiences for some. We used statistical analysis to select an event or points of interest, which we further followed up with several extensive cogenerative dialogues. This chapter has already been published as an article in The Cultural Studies of Science Education journal (Amat et al., 2016).

During the cogens, the narratives of Christian, Matt, and Leah appeared intriguing as they recalled their emotional experiences during their presentations. Synchrony on an emotional level was discussed as students discussed their racial identity, racial ambiguity, and life experiences based on race. In this case, synchrony existed between Christian and Leah, but there was value in the contradiction of heart rates between Matt and his two co-presenters due to the uniqueness of the emotional impact of their presentation on each presenter (Amat et al., 2016).

Using finger pulse oximeters, oximeter analysis, video recordings, and cogenerative dialogues, Chapter 4 investigates the synchronicity between the heart rates of the teacher (Alexakos) and student-researcher (myself) in the fall semester of 2014 on Veteran’s Day at CUNY Graduate Center. The heart rate synchrony
between Alexakos and me was revealed when he spoke intentionally about the Veteran’s Day Parade and veterans. The chapter investigates my emotional experience within the four consecutive minutes with each minute containing salient contradictions and six moments where our heart rates matched. The study is grounded in hermeneutic phenomenology, social cognitive theory, and autoethnography. Applied to these theories are critical race theory and cogenerative dialogues through the use of video recordings.

Doing research using mindfulness-based tools such as finger pulse oximeters has brought me back to Kincheloe’s criticality, or critical pedagogy, which implies expanding beyond the curriculum (Bayne, 2009). Emotions have been researched in education as a way of making students more caring and compassionate (Mayer, 2000). Emotional responses of teachers and learners to experiences in academic “safe” spaces need to be examined as this area lacks research. Research is needed to explore how teaching | learning is emotionally supported in academic “safe” spaces with respect to emotional experiences. This research encourages participants to be mindfully aware of their emotional experiences in these learning environments to be better supported and defines an Emotionally Adaptive Pedagogue. In Chapter 5, I argue for a need for a theoretical framework for Emotionally Adaptive Pedagogy because teaching | learning are interchangeable, and academic “safe”
spaces are those that foster interactions where learning is the outcome. Emotionally Adaptive Pedagogy merges research with emotion and research with teaching | learning where the influx of emotions come and go in learning environments both in and out of the classroom. Research in emotions should not be limited to students becoming more caring and compassionate. Therefore, Emotionally Adaptive Pedagogy questions how emotional experiences foster depth in understanding positionality and identity of self and other, awareness or self and other, an aspect of seeing, tackling, and understanding something new and different and the emotional journey of such teaching | learning.

In Chapter 6, I reflect on my journey as a result of my research as both participant and researcher. I also share some insight on how my research has evolved me as a teacher.
2. Oximeter Analysis and Cogenerative Dialogue Exposes Hidden Emotional Experience

Corinna: Many times in a classroom, having to present makes me feel sick to my stomach. The experience of even knowing that I will have to present in public is dreadful regardless of the size of the audience. Not really understanding the need for it outside of business meetings, I felt that it could be a practice that educators would stop using. While there are great reasons to have presentations assigned – even group assigned presentations – my anxiety built a wall of intolerance. [Author’s thoughts and way of interacting with reader (Maanen, 2011)]

Petra, a young woman studying to become a science teacher, was taking a course with Konstantinos Alexakos, the professor of the science education course, at CUNY Brooklyn College in the spring semester of 2012. The class participated in a study that incorporated video recordings and finger pulse oximeters, to collect data on physiological responses to emotional stimuli heuristics, cogenerative dialogues [cogen] and clickers to gather participant feedback of experienced emotions and climate in the classroom. Kenneth Tobin and Alexakos were the lead researchers exploring emotions and emotional climate in teaching and learning. In this chapter, I identified a salient contradiction as an event to explore the anxiety Petra experienced at the beginning of her co-presentation in front of her class.

Sometimes we have nothing to be scared about, but the mere anticipation of what could possibly go wrong worries us to the point of fear, otherwise known as anxiety (Frazzetto, 2014).
Adapting Peter Waldman’s (2015) use of Van Maanen’s (2011) narratology, I weave in my own experience and thoughts on anxiety over presenting and public speaking, as I investigate and learn from Petra’s experience. Introducing my own voice allows me to become more aware of how I feel about presenting, although I also was told that I did not look nervous.

To investigate Petra’s anxiety experiences, this study was grounded in Interaction Ritual Chains (IR), Event-Oriented Inquiry, and Hermeneutic Phenomenology. Tobin’s development of Event-Oriented Inquiry adapted Sewell’s (2005) understanding of emotion interpreted as a spike in the curve, which highlighted change or conflict in what was happening in the moment (Tobin, 2014).

The theory Interaction Ritual Chains (IRC) require four elements: there has to be one other; there must be a connection or solidarity associated with the other; a distinct barrier that connects the associated group; and there must be an emerging emotional output shared by all members of the associated group (Collins, 2004). IRC grounds this study, because interaction does not restrict itself to a physical other. Collins (2004) does acknowledge the internal self, or inner voice, as part of the other as well. Hermeneutic Phenomenology is the exploration of what happened from the perspective of the person who experienced it and
why it happened (Roth, Tobin, & Zimmermann, 2002). Hence, hermeneutic phenomenology is a major part of this study.

The event discussed here took place during the fifth week of the course. Petra was having an internal conversation with herself as she was about to take her turn at presenting. The internal conversation, between herself and her inner voice, was an inner interaction ritual chain within another interaction ritual. In the minute before she began presenting, the emotional experience was surreal for her, because this emotion surfaced as she was waiting for her moment to speak in her presentation. It was through the cogen following the presentation that Petra communicated her emotional experience at that moment. In the video, she displays visible coping strategies like fidgeting fingers, or rotating a ring on a finger. Nervousness and stress are symptoms of anxiety (Frazzetto, 2014). Two of the questions arising in this research were: Why was Petra anxious about presenting? What about this presentation made Petra anxious?

Oximeter Analyses in Teaching | Learning

*Corinna: I had hoped to find something interesting about it as well, and I did. Petra’s experience became not just a point of interest for me, but also a reflective experience for myself about my own public speaking.*

The class incorporated oximeters for presenters to wear each week. Oximeters are devices that collect three readings: heartrate [HR], blood oxygenation [SpO₂], and strength of the heartbeat [PLETHY]
(Calderón, 2014). The data would be saved automatically as an Excel file if the device was connected properly to a computer with Bluetooth access. After observing the HR column, Petra’s heart started to race. It contradicted the HR pattern Petra had at the beginning of the oximeter file collected during the class session. After identifying the event, the data, along with transcripts from the video recordings, helped in further investigating what happened during the event. Thus identified, this event was further analyzed on a macro-level, meso-level, and micro-level.

When I next looked at the video, what I saw was amazing. Petra was about to present with two other students, when her HR went up before she began speaking.

Corinna: You see, when I present I am completely nervous. My palms start to sweat and/or feel cold. My heartbeat seems to drown out the sounds of the room to the point where I am no longer involved in what the class is discussing. I have always struggled in some way with presentations. I felt like I understood what could have been potentially what Petra was experiencing; however, I am not her. She had her own feelings and I was very curious to find out what she felt she was going through.

This particular chapter investigates Petra’s physiological responses to her anxiety in the classroom and focuses on the data collected from the videos, oximeters, and cogens during the fifth week of the course. Finger-pulse oximeters offer three readings per second and per frame. There are 25 frames per second. As frame 10 had been used previously by those in the research squad, the analysis for this study did the same.
I found it interesting that what seemed steady and normal HR started to increase rapidly a minute before Petra began to speak (Figure 2.1). It has been found from the work of others that free speaking causes the HR to increase (Bernardi, 2000). Petra had not yet started to outwardly verbalize her thoughts, when her HR began to increase steadily. With Petra’s HR accelerating rapidly during the sixty seconds, this rapid change of beats per minute (bpm) revealed a salient contradiction to the consistent HR that was below 100 bpm in class.

This study is grounded in Event-Oriented Inquiry (Tobin, 2013). Tobin’s development of Event-Oriented Inquiry used Sewell’s understanding of emotion interpreted as a spike in the curve, which highlighted change or conflict in what was happening in the moment. Tobin’s study with oximeters incorporated analyzing Donna’s HR, PLETHY, and SpO2 before and while teaching. Donna King, a professor for pre-service science teachers, wore an oximeter, permitting Tobin and colleagues to research her HR, PLETHY, SpO2, and the emotional climate (EC) of the class. Tobin used event-oriented
inquiry, identifying events by searching for salient contradictions, and hermeneutic phenomenological methods to investigate Donna’s emotional experiences on multiple levels, but grounded his study with polyvagal theory, whereas this study focused on Collins’ interaction ritual theory and interaction ritual chains. Tobin, as in the event discussed here, used descriptive statistics in addition to looking at both HR and PLETHY to identify events (Tobin, 2016).

After identifying the event and watching the video of Petra’s presentation, I used a cogen Petra had done with Alexakos to gain further information about what Petra felt, from the participant herself. Cogens are low-risk communal sessions that occur as either a reflection on evidence of what occurred or collective reflection upon what occurred throughout the experience of the research. Events need further understanding and unpacking from those that experience it and cogens offer a low-risk, safe space (Roth & Tobin, 2001; Tobin, 2012). Roth and Tobin investigated a teacher’s approach to teaching and learning in a science classroom through the use of cogens, as it was a shared experience between the members who partook in the class.

In this study, the video recording allowed insight to what occurred in the classroom during the event and the cogens. This chapter discusses Petra’s anxiety from a minute before her turn to
talk came during the presentation with two co-presenters, Paula and Ian, on the topic of gender, sexuality, and education.

What happened to bring about this salient event?

The video recordings along with oximeter readings were used to capture data. Petra and her co-presenters prepared to speak to their peers about gender roles and how stereotypes may affect the success of each gender within the classroom. While Petra stood in the front left corner and faced the class, another student, Laura, a classmate being presented to, started to talk to the class about her own personal experience as a female and her knowledge of tools.

<table>
<thead>
<tr>
<th>Time</th>
<th>What was said?</th>
<th>What was heard?</th>
<th>What Action was Done?</th>
</tr>
</thead>
<tbody>
<tr>
<td>18:50:00</td>
<td>Laura: [118]... Well</td>
<td>Phlegmy coughing</td>
<td>Everyone was looking forward. A coughing student was seen covering mouth. Female co-presenters were looking at projected slide on screen and male presenter was looking at his female co-presenters.</td>
</tr>
<tr>
<td>18:50:01</td>
<td>Laura: I’m the oldest.</td>
<td>Student was still coughing</td>
<td>Petra was touching something on the table in front of the board where the projection screen was.</td>
</tr>
<tr>
<td>18:50:02</td>
<td>So he used to kinda like</td>
<td></td>
<td>Petra was going back to where she was standing with her co-presenters</td>
</tr>
<tr>
<td>18:50:03</td>
<td>[123] call me</td>
<td></td>
<td>Petra was completing her placement by her female co-presenter and both were looking at the projected PowerPoint (PPT) slide</td>
</tr>
<tr>
<td>18:50:04</td>
<td>to...- if he had- he had</td>
<td></td>
<td>Female co-presenter, Paula, was looking at the class and towards the end of this moment Petra started to also look at the class</td>
</tr>
<tr>
<td>18:50:05</td>
<td>this <em>inaudible</em>[125]</td>
<td>Sound (timer?) sounded off</td>
<td>Students reached for their clickers to indicate their emotional level in the class at that moment. Petra used the clicker that was already in her hand then took a step forward. She looked like she was about to place it on the front table,</td>
</tr>
<tr>
<td>18:50:06</td>
<td>so he would call me to like</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:50:07</td>
<td>identify [126]#</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
but then was seen stepping back while keeping the clicker in hand. After they clicked, the class seemed to either look at Laura (including presenters) or to the front of the classroom.

<table>
<thead>
<tr>
<th>Time</th>
<th>Transcript</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>18:50:08</td>
<td><em>like specific tools [128]</em></td>
<td>Between the period when Laura was heard saying ‘tools’ and ‘and stuff’, Petra’s PLETHY was really high. As “tools” was heard, the last chime of the timer sounded also.</td>
</tr>
<tr>
<td>18:50:09</td>
<td><em>and stuff like</em></td>
<td>Students finished clicking.</td>
</tr>
<tr>
<td>18:50:10</td>
<td><em>that.</em></td>
<td>Petra was shifting clicker from hand to hand, like very slight juggle.</td>
</tr>
<tr>
<td>18:50:11</td>
<td><em>So, but in some</em></td>
<td>When “my aunt” was heard, Petra’s PLETHY was very high again.</td>
</tr>
<tr>
<td>18:50:12</td>
<td><em>cultures like my</em></td>
<td>When “home” was heard, Petra touched her nose, and remained touching her face. Her hand moved from her nose to her right cheek by the time “tools” was heard, while Paula began to scratch/touch nose.</td>
</tr>
<tr>
<td>18:50:13</td>
<td><em>Aunt in their</em></td>
<td>Petra and Paula brought their hands down at the start of this moment completing the action by the time “masculine” was heard. Petra kept both hands in front of her stomach holding clicker and Paula had her hands behind her back.</td>
</tr>
<tr>
<td>18:50:14</td>
<td><em>home the girls</em></td>
<td>Petra was steadily rotating clicker with her hands holding both ends of the clicker. (between second 20 and 29)</td>
</tr>
<tr>
<td>18:50:15</td>
<td><em>are not allowed to be</em></td>
<td>Ian adjusted his shirt.</td>
</tr>
</tbody>
</table>
| 18:50:16 | *anywhere around tools[129]* | When “cultures” was heard, male co-presenter looked down to the floor or at his feet quickly then looked back up, adjusted his shirt and massaged his left wrist. Petra was still rotating clicker. While Laura was saying “male in the*
<table>
<thead>
<tr>
<th>Time</th>
<th>Transcript</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>18:50:34</td>
<td>the um - the um</td>
<td>Petra started to scan the class from her right to her left (4 to 5 seconds).</td>
</tr>
<tr>
<td>18:50:35</td>
<td>idea is that both men and women</td>
<td>Petra was still rotating clicker. When “idea” was heard, male co-presenter, Ian, brought left hand to right ear (the top part) while right hand remained on left wrist. Then, he shifted his left hand to right wrist and massaged it really quickly. He next rested his left wrist over his right wrist on top of what looked like a container on the front table.</td>
</tr>
<tr>
<td>18:50:36</td>
<td>can learn to do the</td>
<td>Some students nodded in agreement.</td>
</tr>
<tr>
<td>18:50:38</td>
<td>Anthony: Right.</td>
<td>Petra looked down at the clicker while she continued rotating it.</td>
</tr>
<tr>
<td>18:50:39</td>
<td>Laura: Because if you</td>
<td>When a student researcher saw HR go to 151 he drew the attention of another researcher sitting next to him. Petra was still looking down at clicker she was rotating.</td>
</tr>
<tr>
<td>18:50:40</td>
<td>ask one [151] of my</td>
<td>Petra looked down at the clicker while she continued rotating it.</td>
</tr>
<tr>
<td>18:50:41</td>
<td>small sisters who</td>
<td>Petra looked at the class.</td>
</tr>
<tr>
<td>18:50:42</td>
<td>never used to be around</td>
<td>Petra shifted to her right foot and was just holding clicker in place - not rotating (17 seconds).</td>
</tr>
<tr>
<td>18:50:43</td>
<td>'Okay, come fix this screw.'</td>
<td>Some students laughed</td>
</tr>
<tr>
<td>18:50:44</td>
<td>It will keep falling all the</td>
<td></td>
</tr>
<tr>
<td>18:50:45</td>
<td>time on the</td>
<td></td>
</tr>
<tr>
<td>18:50:46</td>
<td>ground.</td>
<td></td>
</tr>
<tr>
<td>18:50:47</td>
<td>Right?[152]So I’m like</td>
<td></td>
</tr>
<tr>
<td>18:50:48</td>
<td>'Okay -</td>
<td></td>
</tr>
<tr>
<td>18:50:49</td>
<td>We both can do [151] the</td>
<td></td>
</tr>
<tr>
<td>18:50:50</td>
<td>same thing male or</td>
<td></td>
</tr>
<tr>
<td>18:50:51</td>
<td>female. You don’t</td>
<td></td>
</tr>
<tr>
<td>18:50:52</td>
<td>need to have a maleness.</td>
<td></td>
</tr>
<tr>
<td>18:50:53</td>
<td>We learn,</td>
<td></td>
</tr>
<tr>
<td>18:50:54</td>
<td>But just different</td>
<td></td>
</tr>
<tr>
<td>18:50:56</td>
<td>have taken a longer</td>
<td></td>
</tr>
<tr>
<td>18:50:57</td>
<td>time to know what is</td>
<td></td>
</tr>
<tr>
<td>18:50:58</td>
<td>a hammer</td>
<td></td>
</tr>
<tr>
<td>18:50:59</td>
<td>whereas a-a</td>
<td></td>
</tr>
<tr>
<td>18:51:00</td>
<td>a male</td>
<td></td>
</tr>
</tbody>
</table>
Petra’s HR throughout the minute is indicated in the brackets. Petra, who was the only presenter wearing a finger pulse oximeter, was standing at the front left of the classroom next to her co-presenter while Laura, their classmate who was not presenting, spoke for about sixty seconds (detailed in Table 2.1). Petra’s HR increased steadily to 151 beats per minute (bpm) where she exhibited a high level of oxygenation at 98%. The first moment that Petra’s PLETHY peaked was between 18:50:08 and 18:50:09, which is captured in the screenshot in Figure 2.2 (above right). Petra had clicked her data on her clicker and positioned herself next to her female co-presenter, Paula, right before her PLETHY rose. Laura was talking about her experience with gender roles in her example about tools. The timer sounded, alerting the students to make a note of their emotional state in the classroom. The second moment her PLETHY peaked happened 3 to 4 seconds later as Laura was saying “my aunt”, as depicted in the screenshot in Figure 2.3 (above left). Her HR maintained a bpm of 128 throughout the 4 to 5 seconds along with her SpO₂ remaining at 98%. Petra was rotating the clicker in her hands as described about the prior second (Figure 2.2). Figure 2.2 is a snapshot after her PLETHY
rose a second time, Petra started touching her nose, then her right cheek. Following that, her hands were in front of her stomach, as shown in Figure 2.3, and she started rotating the clicker with both hands for approximately 23 seconds. While rotating the clicker, 4 to 5 seconds were spent scanning the classroom. Five seconds later, Petra was seen looking down at the rotating clicker for another 3 to 4 seconds. After that, Petra looked at the class, shifted on her right foot, and was just holding the clicker for 17 seconds. In order to understand what Petra was feeling during the event, a cogen was necessary, because it was the only way Petra would be able to not only reveal her anxiety, but also explain it in greater detail. Observing the change in Petra’s HR caught my attention and was the catalyst that led to me watching the video and listening to the cogen. The cogen for presenters was set up for the students to discuss anything they recalled going through or happening during their time presenting. I focused on the cogen that explained what Petra was feeling during this minute from her own perspective.

**What happened during the cogen?**

This cogen between Petra and Alexakos was recorded two weeks after her group presentation in the class. The group’s presentation
was about gender and sexuality, both of which can be Thorny Issues (Alexakos et al., 2016). For the cogen, Petra met with Alexakos, aware that the topic was observing and discussing her experience of her own presentation.

At the start of the cogen, Alexakos began by asking Petra how the overall classroom experience had been, in her opinion. The conversation then transitioned specifically to the recordings with her wearing the oximeter in the classroom, where Petra recalled her emotional experience of her own presentation. Upon being asked if what Laura said made any impact, Petra responded that there was a mental block because of the preparation needed for her to begin speaking soon. Petra was not aware of what Laura said. Petra focused on her own emotions and her racing thoughts while Laura was speaking. Bakhtin interpreted inner feelings and inner speech as being dialogic, since all utterances are a form of language and contribute to continuous dialogue (Bakhtin, 1994). Collins referred to Wiley’s expansion on the “symbolic interactionist model of internal conversation to six types of participants: me, I, you, temporary visitors, permanent visitors, and the unconscious” (Collins, 2004). Combining Wiley’s expansion with Mead’s understanding of I, Me, & Generalized Other, Collins theorized thought sequence and internal conversation to develop Interaction Ritual Theory [IR] further. IR comprises of the following properties: self and other(s), emotional energy, and
cultural exchange or formation. “Other” can represent another physical being or our internal selves. IR, then, expanded to and included thought and internal conversations, and external conversation with oneself, which Collins attributed to theorists such as Turner, Wiley, Mead, Katz, and others (Collins, 2004).

When Alexakos began the video clip in Table 2.2, Petra admitted that her nervousness intensified as her turn approached. Ekman classified the following as basic emotions: anger, disgust, contempt, fear, joy, sadness, and surprise (Ekman, 2003). Although anxiety is not one of the primary emotions, it is a subcategory of fear, as fear comprises of both terror and nervousness (Frazzetto, 2014).

Table 2.2 Transcript of Petra admitting to nervousness

| [0:54] Alexakos: This is actually ...we spent a lot of time talking, and probably I shouldn’t have done that cause I learned from Angie the other day ... cause people get anxious, and then... Like you stay stressed the whole time. It’s not like you just get stressed when you’re about to speak ... You stay stressed when you’re about to speak. Petra: Oh me? Yeah. Alexakos: That happens with a lot of bodies, like Angie [1:44] |

Ekman defined fear as a learned emotion mostly used to identify the feeling or emotion experienced, and defined by the collective or social structures when most or all have experienced the same feeling caused by the interaction (Ekman, 2003). Frazzetto defined fear as a fight for survival where we have to
fend off enemies, whereas anxiety is anticipation of fear built on worry, nervousness, and stress. Similarly, Petra was nervous before her turn to talk.

Petra: I feel the same way every time I am about to speak in front of a group of people. I have had classmates and colleagues who shared their feelings of nervousness when it came to presentations or even just speaking in front of any size group in and out of the classroom. However, I have met one person as an undergraduate who expressed that he enjoyed presenting as it gave him an adrenaline rush. I did look at him completely surprised because he was the first person I heard that from. Even celebrities, well singers, spoke candidly about having stage fright before their performing for a crowd even if the crowd bought tickets because of their artistry during interviews.

Her group presentation on a macro-level was an IR, the bigger picture of a presentation going on with three collaborating co-presenters on the topic of sexuality that leads into race in teaching and learning. On a micro-level, this was one minute of the presentation where an internal conversation occurred between Petra and her inner voice. Inner thoughts and inner voice can be described as symbolic interaction (Collins, 2004). Collins made clear that IRs are everywhere and can expand or apply to every type of interaction, which is why this internal conversation is an inner IR chain (Collins, 2004). Collins defined an IR as being positive if the emotional energy (EE) transformed into a positive emotion, and negative if the emotional energy transformed into a negative emotion. EE is what an individual looks for as an outcome of their IR, which is also an outcome of this event. This emotional
experience that Petra is experiencing is the influx of emotion during the IR. An IR has the following requirements: a group of at least two physical people, explicit boundary lines that make clear who is in or out of the interaction, mutual understanding and clear focus on the reason for the interaction, and emotion or mood towards the reason for the interaction should be shared. Based on a positive experience of an IR, individuals will have a successful ritual outcome of feeling as a part of the group. Through feeling a part of the group, there would be this group identity that forms, with its own set of morals and symbols (words, visual icons, or gestures) that are assigned to the group, and EE shared by the group that molds into strong group solidarity (Collins, 2004). The higher the solidarity the higher the emotional entrainment, which is the collective effervescence. Collective effervescence is the ownership of their group membership within the IR, so much so that it sustains deeply for a longer period of time the stronger the solidarity is. According to Collins’ IR requirements, the presentation itself in entirety is the IR.

**Table 2.3 Transcript of Petra Anticipating the Reaction of the Classmates**

<table>
<thead>
<tr>
<th>[13:08] Alexakos: So this is you, you’re about to start talking and look and see what happens here. So tell me what it was like going into the presentation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petra: Ummmm It was ner- Like, I felt we were prepared, and I felt we were like synced. And that made me feel more comfortable with my group, but I was still nervous - just by the fact that I had to talk.</td>
</tr>
<tr>
<td>Alexakos: How about the topic itself?</td>
</tr>
<tr>
<td>Petra: The topic - it was just - like I don’t, didn’t feel bad talking about it because we like (um. Can you see me? Alexakos: Yeah. It’s just that you stopped so I was wondering if that was you.) Oh um so like we were prepared. I was prepared with the topic. I was comfortable with it - I just - we had this thing in our minds, “Like how will the class take it?” Like we knew it was either going to go really bad</td>
</tr>
</tbody>
</table>

38
or it’s either going to go really well. Like we were actually expecting some good debates about sexuality, whether we should teach it in school or not, bullying. Like we weren’t sure how people were going to react to that.

Alexakos: What did you think was going to happen?

Petra: I … I really didn’t know. Like - I didn’t know. Like I know it was going to be a good debate so that’s why we had all those questions, but I didn’t about the people’s opinions cause we just hadn’t talked about it. Like we have a couple of people in the class that like to really express their opinions; we knew they were going to, but we weren’t sure. Just because I didn’t know about religious backgrounds, you know everybody is from a different country, and bringing in the gay topic

Alexakos: It’s one of those topics that could’ve...

Petra: Yea, it could’ve easily went the way the video was going. The parents were like: “Do not talk about sexuality in the classroom” “Do not do this” Y’know? “This is wrong” [15:30]

Alexakos goes on to ask her about the presentation, in Table 2.3. According to Petra, content was not a factor in what made her nervous. Additionally, her group spoke about the provocative nature of the content and wondered how the class would receive the information and react. The collective thought process of the three co-presenters doing either really well or really poorly was on her mind. There was no middle ground on her evaluation scale; her expectations, and that of her group, were two extremes. Alexakos then asked her to elaborate by detailing what was anticipated. Her response was not knowing if they would actually interact, not knowing their beliefs, and knowing that it could be possible that the response could be similar to a video the group had shown earlier in the presentation. Even knowing that a couple of her classmates interacted and participated in the class discussions
consistently, there was always the chance that even they might choose not to.

Corinna: Besides, we want most of the class to participate, not just two additional voices.

Table 2.4 Transcript of Petra’s Emotional Experience as Her HR Increased

<table>
<thead>
<tr>
<th>Alexakos: What’s happening here? Paula turns and talks to you? What is she saying to you? That it’s time to get ready? Is that what she’s saying?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petra: Um, no. It’s just “Was that good enough?” I don’t know. I don’t know what she said.</td>
</tr>
<tr>
<td>Alexakos: Because after she talks she turns to you.</td>
</tr>
<tr>
<td>Petra: Ohhhh because I wasn’t sure if she was going to</td>
</tr>
<tr>
<td>Alexakos: Yea see. As soon as you picked that up. Now see you picked up the remote, right?</td>
</tr>
<tr>
<td>Petra: Because I wasn’t sure if she’s actually going to present a couple of slides that related to that topic that we actually forgot to discuss. I was ready to present all of the history. That. That was no issue for me. I just thought she might talk about that a little bit like just the schooling part. So that moment I picked it up, that’s when she told me like okay it’s going to be my turn.</td>
</tr>
<tr>
<td>Alexakos: As soon as that happens now you’re 128.</td>
</tr>
<tr>
<td>Petra: I’m getting ready to ... Fly? (she laughs a little bit) (Alexakos: You’re getting ready to...) Escape. [29:23]</td>
</tr>
<tr>
<td>Alexakos: See look at that...Laura is still talking and now you’re...</td>
</tr>
<tr>
<td>Petra: Because now I’m preparing in my mind... to talk. [29:32]</td>
</tr>
</tbody>
</table>

Table 2.4 details what the event highlighted in this study as significant and Petra’s HR is increasing before she opens her mouth to speak to her classmates. Petra forgot for a brief moment what her co-presenter, Paula, said to her as Petra was getting the clicker for the screen projector. Paula was letting her know that it was about to be Petra’s turn to speak. As soon as that happened, Petra’s HR started to increase. In describing what that felt like for her, Petra recalled feeling like, “I’m getting ready to *brief pause* fly” followed by a bit of laughter. Alexakos said, “You’re getting ready to,” before Petra interjected saying, “Escape”. Paula spoke to Petra right before the event occurred. What we
looked at in the graph in Figure 2.1 and the transcript in Table 2.1 is a result of the exchange. We saw and read what was occurring in the class as Petra was flying. Her PLETHY, detailed in Tables 2.2, 2.3, and 2.4, was only up during two instances of this minute which indicate that there was no outward breath, or oxygen in her blood. For most of the minute Petra’s PLETHY was normal, meaning that there was oxygen in her blood. As Petra was flying, so was her HR. Collins (2004) does describe IR Theory from a lecture perspective; however, lectures are usually from the teacher or a person viewed in the role of a “Big Shot”. Collins discusses Durkheimian understanding of front stage and back stage work. Front stage is the presenting while back stage is the preparation it will take to do the presenting (Collins, 2004).

<table>
<thead>
<tr>
<th>Table 2.5 Transcript of Petra’s Focus on Laura</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexakos: Look at that it’s at 152 in the video</td>
</tr>
<tr>
<td>Petra: Yeah... I was listening to what she was saying but I wasn’t focusing on her.</td>
</tr>
</tbody>
</table>

When during the cogen Alexakos pointed out to Petra that her HR reached 152 while Laura was speaking (Table 2.5), Petra began to reflect on her emotional experience. Petra mentioned the difference between how the presentation went in her thoughts versus how the presentation would be understood in actuality. The level of uncertainty Petra had about the class understanding her caused anxiety, and the cogen experience of replaying the presentation
was the first time Petra heard herself. Alexakos asked if the HR activity had to do with feelings of stress or anxiety. Petra agreed to both feelings. When asked why there was anxiety, Petra said the following: “I’m still [anxious] because I’m constantly focusing on what I have to say next and how I should recover from a slide, and am I missing something, and what’s on the slide, what do I have to say, and how is it going to come out of my mouth?” Petra listed seven points of concern about how the class would better understand her content knowledge. Alexakos then asked for confirmation of his understanding that her anxiety was more about the act of presenting and not about the content itself, to which Petra responded, “No”. While the earlier part of the concerns were class participation and interaction with the content delivered in the presentation, in Table 2.6 Petra added that the concerns were as follows: her peers asking questions that could not be answered by the co-presenters; and correction by the professor on the spot.

Table 2.6 Transcript of Petra Detailing Why She Felt Nervous Before Even Speaking

<table>
<thead>
<tr>
<th>Time</th>
<th>Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>32:19</td>
<td>Alexakos: So while you’re watching something that went up from 158 to 164, here… now that I stopped it actually it went up, but before as you were watching this it went from 88 to 91. And as I paused it, it went up to 94… 95. So how does it feel? Here, you don’t have to wear this anymore (removes oximeter). So how does it feel watching this?</td>
</tr>
<tr>
<td></td>
<td>Petra: I’m curious now.</td>
</tr>
<tr>
<td></td>
<td>Alexakos: About what?</td>
</tr>
<tr>
<td></td>
<td>Petra: How I talk… It feels weird. I don’t watch myself ever. Ever.</td>
</tr>
<tr>
<td></td>
<td>Alexakos: Yea it took me a while to get used to myself. Now I just… Before, when I used to record my class. I used to watch me first……. You have a very good voice.</td>
</tr>
<tr>
<td></td>
<td>Petra: I’m glad. It sounds clear in my head. [34:30]</td>
</tr>
<tr>
<td></td>
<td>Alexakos: It still stays up though. You’re at 148. So even when you’re not talking, I guess you’re still stressed? (Petra nods yes) You’re very anxious?</td>
</tr>
</tbody>
</table>

42
Petra: Yes I’m still because I’m constantly focusing on what I have to say next and how I should recover from a slide, and am I missing something, and what’s on the slide, what do I have to say, and how is it going to come out of my mouth?

Alexakos: And you can see it here. You’re between 148 and 150.

Petra: So even when someone else talks, because I know how many slides I have I know I’m still going to be talking. So it’s like…

Alexakos: So this is mostly about the presentation not necessarily about the content at this point?

Petra: At this point no. The content comes in…because this is mostly history. So I was comfortable presenting the history. The content comes in with African-American and Black. Um. I mean. If it’s content, it’s just a hint of it because I’m always nervous about if the class would ask me something. If you’re going to ask me something and I may not know. (She laughs) Or you tell me, “That’s wrong”. (She laughs) [36:08]

Alexakos: I used to do that more often. I don’t do it as much anymore… you know?

It’s always a hard question to balance. I’ve been scariring people, and… (Both laugh)… and correcting people

Petra: (she laughs) Yea.

Alexakos: You know so some of my students may take issue with that. I don’t mean…and it’s like okay… If you do, then what happens?

Petra: I don’t mind your comments anymore...

Alexakos: Yea…I try not to make them.

Petra: But here, I know I’m focusing on really the PowerPoint and what’s on it and try to remember everything I have and just putting it together to…to speak clearly

Alexakos: To speak?

Petra: Clearly? With… Less of an accent. [37:03]

It is evident in this cogen that Alexakos’ teaching had transformed in making him aware of how students felt about being corrected in the classroom. Alexakos did admit that in his teaching he found that students at times took issue with correction from him. Petra added that being corrected by Alexakos was no longer much of a concern. There was clarification that content knowledge was a small part of the concern, and that being understood was a much greater concern. Going into this class session, the class was expecting a group presentation. The three presenters were the collective group presenting to the rest of their class of peers, and those peers and the professor were the outsiders. The mutual
focus from the collective was to have a successful presentation by making it as interactive as possible which would contribute to its being clear and understood. The shared mood came across as driven and of excitement to lead an engaged, interactive, and clearly understood presentation. Since this was during the IR, the IR outcomes were unknown. Solidarity was identifiable because Petra spoke on the co-presenters’ collective presentation goals. Petra’s inner voice, led by anxiety, focused on clarity via preparation and communication and her accent. The weight of communication was heavier for her than the content itself. Using the Meadian Framework of “I”, “Me”, and “Generalized other”, as explained by Collins, Petra’s internal conversation represents an inner IR chain (Collins, 2004).

**Seven Anxiety-ridden Concerns for Petra**

The interaction between student presenter and the audience emphasized that the act of presenting is not solely about the student presenter while speaking aloud, but also about the inner voice. During the above cogen, Alexakos invited Petra to recall what was happening during her presentation and why this was happening. Upon seeing her HR increasing, Petra was alarmed. When asked what her experience of seeing her HR increasing was, Petra responded that seeing high numbers was unexpected. When asked if there was any nervousness during the presentation, Petra agreed. Petra recalled what was happening while Laura was talking about
tools. While Petra mentioned that there was a bit of self-consciousness about her English-speaking abilities, there was also concern about what would be said next, recovery methods should a mistake be made, doubtfulness of being fully prepared, what was on each slide, what to say, and how to actually form the words necessary to be understood.

Corinna: Being anxious neither takes away from nor adds to how passionate you are about the content you are discussing or trying to discuss. Passion, after all, can underpin feelings of either excitement or anger.

The questions Petra asked herself are listed as categories in Table 2.7 below. The weight of each can vary as Petra did clarify that the concern was more about how to better communicate her points than her content knowledge. Each concern was categorized as an interaction skill. Interaction skills attempt to deal with academic tasks that take place in a learning environment, like presentations. Alexakos asked Petra if the anxiety was related to preparedness or about talking to the class. Preparedness represents content knowledge based on research and preparation of slides, and communication represents how the content knowledge will be shared with the people in the learning environment.

<table>
<thead>
<tr>
<th>Points of Concern During Presentation</th>
<th>Interaction Skill</th>
<th>Tense</th>
</tr>
</thead>
<tbody>
<tr>
<td>How will my English-speaking skills be interpreted? (accent)</td>
<td>Communication</td>
<td>Future (frontstage)</td>
</tr>
<tr>
<td>What do I say next?</td>
<td>Communication</td>
<td>Future (frontstage)</td>
</tr>
</tbody>
</table>

Table 2.7 Seven Points Petra was Anxious About during 60 Seconds
In Table 2.7, I highlight which points focused on preparedness on the content of the presentation and which focused on clearly communicating the knowledge to her peers.

Corinna: Looking at Petra’s questions, I see it as possible fear of failure, more specifically of being misunderstood. I think when I presented I was afraid of failure, period. Since I knew I was being graded after all. I understand Petra’s point in being sure of the content. I never stopped to disseminate what it was about the presentation that bothered me so much. I much prefer just exchanging my thoughts with one person at a time rather than a group of people at a time, especially if I am still at a point where I am still learning it.

Petra worked with her group to not only share information, but to have the class interact and openly share their thoughts on the content in a scholarly capacity. Any point that addressed her having to speak to the class was classified as communication, while anything that was based on recall was classified as preparedness. Petra was, as stated in Table 2.6, more concerned with her delivery. In her case, there was a lack of confidence about how good her English was. Petra thought her accent would be too strong.

Expanding on Collins’ IR theory I have added Tenses in Table 2.7; IR theory entails bringing in prior experiences of EE with interactions into the next experience. Since Petra’s worry was
about her accent, her awareness that English is not her first language impacted the delivery of her content knowledge. This is highlighted as *Future tense*, as Petra had yet to speak. Past speaking experiences caused her to anticipate being unclear and misunderstood. There was also mention of uncertainty about which terminology to use, as parts of the conversation included race: “Black” or “African-American”.

Petra anticipated the potential reaction of her class to her content, as she planned how to transition from one point to the next, rendering this point also in the *Future tense*. Recovery from making a mistake is also *Future Tense*, as being unclear was an anticipation. Preparation here was about being ready to correct any misunderstandings. This is over-preparation, because being misunderstood is not something that can be calculated. Anxiety is great worry as to the possibility of failure (Frazzetto, 2014). It is important to highlight here that while there was no likelihood of her making a mistake, given that Petra was confident of her content knowledge, there was still preparation for recovering from mistakes before even speaking, and the possibility of being corrected by the professor. In the cogen with the professor, Petra mentioned being corrected by the professor and being no longer anxious about that possibility, which reinforces the IR characteristics of bringing in prior experiences and the emotions that came from these into the next.
The next two points are about preparedness, addressing readiness and recall. Readiness to present with technology (i.e., PowerPoint slides, Prezi, Posters, note cards, etc.) that helps us requires work to be done beforehand. Recall, on the day of the presentation, has to do with remembering the points needed to be made that goes along with what has been gathered together for the presentation. Since both readiness and recall require prep work and research before the day of the presentation, both are categorized under Past Tense as Petra and the co-presenters had to have both done by presentation time. When preparing to say or do something, a quick mental check for readiness may occur. Petra went even further, asking herself how well each slide was stored in her memory.

Petra was concerned about what to say, which is labeled as Current Tense. Petra wanted to start putting her words together now before speaking, which leads to her final point of what words to use. The final point is also identified as Current Tense, as the majority of the concerns were about being understood, and being able to express her main points to the class clearly and correctly. Tenses and Interaction Skills are used to categorize Petra’s concerns on how to complete a task assigned to her in a learning environment. Navigating how to co-present on a difficult topic such as gender and including talking about race in a way that would bring about dialogue in the classroom is stressful. Collins’ IR
theory is grounded in Goffman’s theatre model within Frame Analysis (Collins, 2004). In Goffman’s theatre model, backstage is work that is done behind the scenes to “deceive” and “manipulate” the audience into buying into the performance that happens frontstage, or on the main stage. Collins argued that IR theory incorporated backstage and frontstage in social interactions in the work place, religious institutions, lectures, and more (Collins, 2004). Petra mentioned during the cogen that Paula wanted to revisit, or clarify, a point that was misunderstood before Petra’s turn. There is a possibility that Paula’s need to clarify a point may have added to Petra’s anxiety, justified her being anxious, or caused the anxiety Petra experienced. In either case, the co-presenters collectively attempted to present in a way that would goad their peers into joining the conversation. Petra wanted to maintain the goal of her co-presenting group. The moment right before starting the presentation is a moment where there is potentially an influx of emotions or, as some people may express it, “the moment of truth”. This significant event revealed a pivotal moment in an interaction, which is lacking in research on teaching | learning.

Presentations are common in the classroom, both individual and group assigned, and definitely understood by many who have been in classrooms before as either teacher or student. The emotional outcome that Petra would be looking for in this IR would be that the presentation went really well, as stated in the cogen.
Success would equate with being understood by her own standards. There were two extremes also as defined by her group, that the IR would either be a positive or a negative experience. Petra wanted to give herself the opportunity to ensure a positive emotional experience, so the thoughts caused doubt and uneasiness, which is why at the start of her portion of the presentation there was stress and anxiety. To suppress her stress and anxiety, the seven points of concern offered a mental check that would ensure a successful presentation experience for her. Two of her points could not be changed on the day of the presentation and they were labeled in the Past tense (backstage). The remaining were aspects that would be dealt with during the presentation that would positively impact the IR, as it depended on her communication with the class and clarity. Her concern in the latter was her language accent as a non-native English speaker and about using the right words. Language was a concern and there was a distinction made between the concerns about sounding clear in your own thoughts versus being uncertain of how you sound to others.

Corinna: I concur, I sound amazing in my own thoughts as well. Plus, I know what I mean to get across and the intentionality behind how I structure my sentences.

With the Current Tense, Petra was focused on how to begin her presentation. Just like first impressions are important, what’s said at the start and end of a presentation are important. The
Future Tense (frontstage), would be how to progress and transition through her points. Anxiety is focused on both the Current Tense and the Future Tense (frontstage) as the apprehension is built by anticipation and worry of her communicating the content. Had there also been a sense of unpreparedness, the backstage portion of the IR skills would have deepened her sense of anxiety.

Corinna: This is where we see people try to wing it in their presentations.

**Preparedness versus Being Understood**

The mere awareness that the moment to present was just a few seconds away triggered Petra to become anxious and immediately concern herself with how to express herself clearly and finish her presentation feeling understood by her peers and teacher. Her seven questions are broken into three main concerns that can either lead any student presenter to feeling anxious or confident (Figure 2.4).

![Figure 2.4 Emotion in IR](image-url)
The main ideas from the tenses are placed in three categories, in Figure 2.4, with regard to the following three questions: Did I do enough; Am I saying enough now; and What to say next? Past Tense is what cannot change (the backstage work), Current Tense is what can be said now to prevent any misunderstandings, and Future Tense is recovering and clarifying based on the anticipation of failure or messing up our point. In the moment, there was concern on whether enough would be said and what to say next, even though the co-presenters felt prepared. Speaking to her peers and to the professor clearly was more of a concern for Petra, to the point of anxiousness, or nervousness. Worries about what to say next, how to recover from a slide, what to do if we miss something, remembering what’s on the slide, what to say, and what actually comes out was all Petra was thinking about in the minute leading up to her own presentation, as detailed during the cogen. Due to her HR being statistically significant over time by p<.01 during this event, this emotional experience that Petra had is evidence that emotions and HR do have a dialectical relationship to one another. There are many who have gone through what Petra has gone through before presenting in the class, myself included. If I had looked at the oximeter readings alone, I would not have known that the experience had no audible verbal interaction on her part. The fact that Petra was just standing there in front of the room with
two other presenters just waiting for her turn to present was remarkable and unexpected for me. The interaction Petra had during this event was with herself before starting her part in the presentation with respect to the rest of the class. While Laura was speaking, her HR was already increasing as her emotions and inner voice were engaged in an anxious exchange, or dialogue. That engagement between herself and her inner thoughts may have been a way of coping to reassure herself that Petra did and can in fact address those seven points of concern. The influx of emotion that occurred before doing an assigned task such as presentation points out that there is something that occurs between the backstage and frontstage within an interaction.

The goal of Figure 2.4 is not deterministic for finding a solution to anxiety nor is it about putting an end to presentations. Reflecting on the evidence found in Petra’s case and relating to her experience as a shy person myself, at first I tended to think of her experience while waiting to present as solely what a few unlucky students feel. I did not think of the act of being nervous while presenting as a phenomenon to look more closely at, because I personally know of others who enjoy presenting and feel they never get nervous. However, Petra learned about her clarity in speaking to others because of the cogen. Wearing an oximeter helped, because seeing her HR rising during the playback of the presentation brought awareness. The three
points, “Did I Say Enough”, “Am I Saying Enough”, and “What to Say Next” can be talking points in the classroom for grades of any level before presenting, to build a stronger collective effervescence to transform anxiety into confidence when it comes to sharing knowledge and learning in the classroom, impacting both teaching and learning. Also, attaching weights to it would individualize the experience for each student. “Am I Saying Enough” and “What to Say Next” can be emotional, and these are in the moment circumstances in communication and interaction. While as teachers we may discuss presentations with regard to presenting skills and stress preparation, it may not be at the forefront as an issue to allow discussions in perhaps all classrooms. Through this investigation I hope to bring about more discussions on anxiety experiences in the classroom, even if it needs to begin with oximeters in the classroom, video recordings, and cognets.
3. Incorporating Oximeter Analyses to Investigate Synchronies in Heart Rate While Teaching and Learning About Race

Abstract: In this paper, we look closely at two events selected through event-oriented inquiry that were part of a classroom presentation on race. The first event was a provocative discussion about Mark Twain’s (1899) *Pudd’nhead Wilson* and passing for being White. The other was a discussion on the use of the N-word. Grounded in authentic inquiry, we use ethnographic narrative, cogenerative dialogues, and video and oximeter data analyses as part of a multi-ontological approach for studying emotions. SPSS analysis of oximeter data shows statistically significant heart rate synchrony among two of the coteachers during their presentations, providing evidence of emotional synchrony, resonance, and social and emotional contagion.

Resumen: En el presente estudio, se investiga dos momentos que forman parte de una clase de formación del profesorado en ciencias donde se hacía una presentación sobre la problemática racial. El primer momento, está relacionado con una provocativa conversación sobre el tema central del libro de Mark Twain, *Pudd’nhead Wilson*, cuya protagonista se hace pasar por blanca. El segundo momento, está relacionado con una discusión sobre el uso de la N-word. Desde un punto de vista centrado en la investigación auténtica, se utilizan narrativas etnográficas, diálogos cogenerativos, grabaciones de vídeo y datos provenientes de oxímetros como parte de un enfoque multi-ontológico para estudiar las emociones. El análisis de los datos extraídos con el oxímetro, utilizando el SPSS, muestran sincronías estadísticamente significativas entre el pulso cardíaco de los estudiantes que estaban haciendo la presentación, que nos evidencian un contagio social y emocional.

Keywords: emotions · synchrony · teaching · learning · oximeter · race

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Teaching and learning are processes that are imbued with emotional energy (Tobin 2006). Though interactions between self and other(s) affect teachers and students emotionally in the classroom, each participant (teachers and students) processes and interprets these events through his/her own emotions (Van der Ver and Valsiner 1994). Emotions are one of the most important elements in making meaning in face-to-face encounters. The strength of emotions allows individuals to maintain focus on ongoing interactions and, in some situations, to disrupt a conversation (Turner 2002).

Randall Collins (2004) developed the concept of emotional energy (EE), to illustrate entrainment of communicative gestures and emotional rhythms found in social encounters. Thus, participants in events with high emotional valence increase their levels of physical activity and coalesce energy for more agentic interactions. On the other hand, people involved in events with low emotional energy tend to reduce the level of activity and take a more passive way of interacting. Toward this point, some authors, such as Alberto Bellocchi et al (2013), describe the space where such rituals are observed as Emotional Climate (EC). From this approach, individual and collective emotions have a dialectical relationship: individual actions and emotions contribute to a collective emotional climate, but at the same time, the emotional climate in which people are interacting mediates an individual’s emotions. For this reason, researchers like Michalinos Zembylas
argue that it is necessary to take into account the emotional dimensions of teacher knowledge.

While emotions historically were conceptualized through an intrapersonal perspective, more recent studies have investigated emotions from a socio-cultural point of view, with a focus on interactions (Zembylas 2014). These new approaches emphasize the role of culture, power, ideology, and emotional affect on behalf of students and teachers and incorporate the importance and criticality of political and power dominance. Thus, we propose teachers authentically engage in practices that enable them to research their ontologies and learn to ameliorate emotions as they emerge (Powietrzynska, Tobin, and Alexakos 2015).

There are many suppressed, painful emotions that we, students and teachers, bring to the classroom. Some of us are resilient, yet traumatized by experiences that occurred while trying to reconcile ourselves in society. For us, sharing our stories is an opportunity to teach, inform and illuminate what may have otherwise remained hidden. In this paper, we focus on two events that were part of classroom conversations and cogenerative dialogues on thorny issues that we write more about in a separate piece in this special issue on emotions (Alexakos et al in this issue). From our point of view, though they are potentially hurtful, it is important to have these kinds of conversation. Our goal is that through such conversations, participants will become more aware and sensitized
to these issues, and it will, as well, give a voice to those who may have been hurt, and create a space for healing. These thorny narratives can arm vulnerable and marginalized populations with awareness of agentic potential, so that when they encounter similar situations in their own lives, they will not feel alone, but feel empowered to contest and transform such structures. These kinds of conversation (re)produce "new culture," so that over time potentially oppressive macrostructures (discrimination, racism, etc.) can be weakened or eliminated.

**Oximeter Analysis as a Micro-phenomenological Methodology for Measuring Emotional Affect**

Research claims that emotional state affects physiological parameters, while dialectically physiological parameters can modify our emotional state as either changes. For instance, Pierre Philippot et al (2002) explored how breathing patterns can induce some concrete emotional states, such as: happiness induced with deep and regular breaths through the nose, and anger produced with irregular and fast breaths through the nose. Regarding the physiological effects of emotions and linking them to a methodological framework, oximeters are useful tools in investigating visceral emotions enmeshed in teaching and learning (Tobin and Ritchie 2012). Finger pulse oximeters
measure the oxygenation of the blood, pulse rate, and the strength of the pulse.

Corinna: In Fall 2014, I was carrying out research on heart rates in a doctoral class where I was a student and Konstantinos was the instructor. While Konstantinos and I were wearing oximeters each class that semester, I would record the class sessions and later view the videos a couple of days after each class. After reviewing the video for the class on Veteran’s Day, I noticed that there was a synchronous event. While I was sitting quietly in class, Konstantinos began the class with a discussion about the Veteran’s Day Parade going on outside the building on 5th Avenue. This particular discussion led to a dialogue that started off with him saying, “… dare I say it – Race …” Once he said the word “race,” our heart rates met at 79 beats per minute (bpm) and then my heart rate followed his to 80 bpm. I observed that for a span of four minutes, our heart rates were seemingly synchronous during this introductory segment of the class. On a micro-level, there were two seconds observed that showed the heart rates were equal to one another. Konstantinos’ heart rate was 79 bpm, a half second before my heart rate matched his and then together they went up to 80 bpm. There were four minutes in the
class where both of the heart rates were close in proximity when looking at the oximeter readings from the entire two-hour class. On a meso-level, the four-minute time span revealed six salient events where both heart rates were synchronous. The discussion during the four minutes began with announcements of work for the rest of the semester, readings, and talking about the Veteran’s Day Parade in connection with emotions. The same kind of shared synchrony was observed among coteachers during earlier studies done by our research squad (which included Konstantinos and Ken Tobin) at Brooklyn College in Spring 2012 (Alexakos 2015). The vignette I described above occurred in Fall 2014. At this moment I became mindful of this emotional synchrony being represented in the pulses, and I developed an interest in researching emotional synchrony.

According to Collins (2004), moments of synchrony are caused when subtle aspects of interaction create a rhythmic entrainment among people who are interacting successfully. Human beings, not only subconsciously, synchronize this rhythm when they talk to each other, but can also synchronize gestures, body language, and brain waves. However, there are different ways to express social alignment. Michael Roth and Ken Tobin (2010) studied synchronies
in prosodic alignment and found that various vocal projections provide information to the self | other dialectic about emotional state at the micro-level. In their study, they found that in coteaching, coteachers tend to share the same rhythmic prosodic patterns. Moreover, they also provided several examples from video analysis, about how gestures and body movement aligned, which brought forward the question of other alignments, perhaps physiological, which are not captured on video.

We argue that physiological synchronization occurs at the micro-level, in the form of heart rate synchronies, as a means to communicate emotional contagions between people. Emotional contagion, well known amongst socio-physiologists, explains how the social experience affects physiological condition. This contagion, explained from an evolutionary point of view, aids self | other to empathize and understand each other (Collins 2004). Such contagion of positive emotions helps to contribute to heightened collective effervescence in the classroom and contributes to student engagement (Bellocchi 2014).

This study investigates two salient events that occurred between three students, Leah, Christian, and Matt, who shared synchronous and asynchronous heart rates during their classroom presentation on the question of race in the spring of 2015 in a class where Konstantinos was again the instructor (see Alexakos et al in this issue). Avoiding the trap of using statistical analysis solely
based on oximeter data, we employ thick descriptors (using multiple forms of data) within a theoretical framework that values authentic inquiry, polysema, polyphonia (Alexakos 2015). While oximeters were used to select events and highlight moments of heart rate synchrony and emotional contagion, thick descriptors including ethnographic narratives, cogenerative dialogues, and video analysis were then used to further describe and illustrate what was happening during these events, explicate our findings and create new meanings from multiple perspectives and interpretations, including those of the participants themselves. This paper is novel because it links microphysiological data collection and analysis, via oximeter and pulse rate analysis, to macro-sociocultural structures, like race, and physiological responses that are typically hidden or unknown in classroom studies. To our knowledge, this is the first study that examines emotional contagion and the synchronization of pulse rates in an educational context.

**Investigating Heart Rate During Difficult Discussions**

Zembylas (2014) argues that while traditional teacher education focuses on effectiveness in the schools, in order to promote well-being in both teachers and students it is necessary to provide a critical emotional reflection about teaching and learning practices. In the Spring 2015 semester, to this point
of view, Konstantinos taught a graduate course at Brooklyn College for pre-service and in-service teachers on topics related to sociocultural perspectives in science education, such as the history of science and the nature of issues like gender, race, eugenics, and evolution in science education. Issues such as race, gender, and religion, can be thorny issues (Alexakos et al in this issue) as these kinds of topics create the potential for uncomfortable situations and emotional discussions and, for this reason, they are not a normal part of science teacher preparation courses.

This study focuses on one of these thorny issues – race. In this course, students participating in the weekly sessions critically and openly discuss tough sociocultural topics. In the race session, students had to discuss discrimination and racial differences from a critical and historical perspective. They also had to reflect on the role of education in producing and reproducing this social difference, along with how to deal with it. In every class session, two or three students were in charge of leading a discussion on a pre-selected topic with the rest of the class participants. Three people were responsible for coteaching the class related to race: Two of them, Matt (an inservice science teacher) and Christian (a preservice science teacher), were students in this graduate course. The third coteacher, Leah, is a doctoral student (as well as an inservice science teacher) who was a participant researcher
in the class. Leah and Christian were especially interested in this topic, because they identify as persons of color. Matt, who works as a teacher, was interested in this topic because of the multicultural, diverse, nature of the school in which he teaches. All three coteachers wore finger pulse oximeters during their presentation, providing data on individual pulse rates, pulse strength, and blood oxygenation levels throughout the duration of the class. As it is shown by Calderon (this issue), even though there are limitations to the device, oximeters can be a useful tool in order to provide clues to the emotional state of people who are participating in an educational study.

Our approach is based on a hermeneutic phenomenological framework (Alexakos 2015). It is participant-centered and interpretive as to the direction of the research, what constitutes an event, and inclusive of polyphonia and polysemia in describing “what is happening” and “why is it happening” during events. The what and the why are means to theorize, with thick descriptions (that is using multiple data sources), structures at play in social phenomena. Particularly, our approach is inspired by event-oriented social research (Sewell 2005), which requires 1) selection of some events to focus on after video analysis and 2) detail of what is going on at the micro-level. Events are defined in terms of contradictions (Tobin and Ritchie 2012). In our study, we identified events in this teacher education class where the
coteachers share a similar heart rate and pulse pattern. The sociological study of emotions at the micro-level focuses on the physiological changes and expressive gestures, but to theorize without falling into the trap of generalizability and crypto-positivism, a multi-methodological approach to researching emotions is required.

Figure 3.1 Photo of Christian (l) and Leah presenting on race.

Two different cameras were video-recording this particular class session discussing race: one camera was at the front of the room facing the class and one camera in the back-left corner of the room, facing the presenters. The purpose of the camera positioned in the back-left corner was to also record the oximeter data from the three coteachers. The data from the three oximeters were displayed on the screen of two computers, as they were being received via Bluetooth (see figure 3.1). The data set includes second by second oximeter heart rate readings, which were obtained
through computer analysis. In terms of methodology, our first data acquisition models included entering the heart rate readings from different events in the class into a Microsoft Excel spreadsheet. The selected data sets were then plotted to produce graphs to be further analyzed and discussed. Following a multi-methodological approach, we then trimmed the selected events from the video recording, based on overlaps in the heart rate pulse of the coteachers, and we discussed these events with the three co-presenters over multiple cogenerative dialogue sessions (cogen). In the cogen sessions, we video-recorded the conversations about the events that occurred during the class recordings and, together, we (all participants including the researchers, teachers, and students) explored what was happening from an emotional perspective. Finally, we used statistical analyses to discover where moments of synchrony between heart rates were statistically significant.

**Vignette 1: Explaining the story of Pudd’nhead Wilson by Mark Twain**

In this session about race issues, a conversation emerged about the N-word. Even though this topic was not explicit in the official syllabus or in the presentation plan, Konstantinos shared that discussion of this topic (the N-word) was in his “unofficial” curriculum of the course. We chose the 19-second event described below because of our observations of the
seemingly synchronous oximeter readings we observed during this
discussion.

During the discussion about the use of the N-word, Konstantinos asked the students if they had read the story of Mark Twain’s *Pudd’nhead Wilson*, published in 1894 (not on the reading list for the course). *Pudd’nhead Wilson* is a fictional story about a slave, Roxy, who, while very light-skinned, was according to the slave laws still considered Black, because she had one-sixteenth “Black” blood. Roxy had given birth to a son, fathered by a White man. Though her baby by all appearances was White, he too was considered Black, and therefore a slave. In addition to raising her own child, Roxy was the caretaker of her master's infant son, a child of the same age as her own son. Fearing she and her son would be sold and separated from each other, and since the appearance of the clothes of the babies was pretty much the identifying difference between her master’s baby and hers, Roxy made the life-altering decision to switch her son with that of her slave master.

In Figure 3.1, Christian and Leah, two of the presenters, are visible but the oximeter data for all three presenters are presented on the computer screens. During this discussion, Matt went to sit on a chair to the right of Christian (and thus is not in the photo). He only took part in the beginning on the discussion on the book, when he tried to explain to his classmates the
As he was not too sure, his intervention was interrupted by Konstantinos, who went on to explain the story himself.

Matt: In that moment, I was worried because I realized that it would be difficult to accomplish all the activities that we had prepared for the classroom. The conversation went to an unexpected discussion about the N-word and the Pudd’nhead Wilson story. Therefore, I decided to sit down and be less involved in leading the discussion.

When the conversation went into discussing the Pudd’nhead story, Matt was detached from the discussion as described in the ethnographic narrative and registered a difference in standard deviation from the heart rate data (beats per minute or bpm) of the other coteachers. Matt had an average heart rate of 78.6 bpm (standard deviation of 0.4). In the same event, Christian had an average heart rate of 91.5 bpm (standard deviation of 3.9), and Leah had an average heart rate of 92.4 bpm (standard deviation of 3.1). Because Matt was sitting, it is likely a contributing factor to his heartbeat being at a lower rate. Also, while Christian and Leah’s standard deviations over the course of the 19-second event show that their heart rates were changing while listening to Konstantinos’ description of the Pudd’nhead Wilson story, Matt’s
standard deviation shows a heart rate that remains relatively constant throughout the same time interval. To the point of Roxy being one-sixteenth Black in the *Pudd’nhead Wilson* story, Konstantinos asks the class, "How much did you need to be in order to be considered Black? How much was enough?" Following the question, for 19 seconds (from 00:01:57 to 00:02:15), the pulse rates of Christian and Leah, synchronize: the heart rate frequency of both was similar and shared the same increase and decrease patterns, which is shown in Figure 3.2.

Leah: As Konstantinos told the story of *Pudd’nhead Wilson*, I thought to myself that I had never heard of this story and was shocked that it was never a reading that was assigned to be discussed in all my years of schooling. Though having heard this story for the first time, the description resonated with my family history and I began to reflect on how important skin color has been to my family. Over the years, I’ve often thought about how I’d fair as a light-skinned person, if I were born during the days of slavery and I can’t help but think about how my skin color has advantaged me over those who have more pigmentation.
In Table 3.1 below is the transcript over the 19-second event, with the heart rate data of the three coteachers included. Konstantinos is discussing the irony of passing for White, as it relates to Roxy in the story and her decision to switch her child (a slave) with her Master’s child. As the beginning of the transcript, Matt, Christian, and Leah’s heart rates were respectively 79, 88 and 89 bpm. For just one second (00:01:59), Leah and Christian looked at each other, as can be seen in Figure 3.1, while Konstantinos laughed nervously. Just after that moment, Christian and Leah shared the same pulse rate of 89 bpm.

Leah: I looked at Christian because I thought he might remember the “one drop rule” as Konstantinos asked the question, "How much did you need to be in order to
be considered Black? How much was enough?” Ingrained in my ontology is the understanding that, in American history, all it took was one drop of Black blood to legally be declared Black. In many cases, this meant the difference between being free or enslaved. To answer Konstantinos’ question, I was going to say, “one drop was enough to be considered Black”, but I looked to Christian to see if he could assuredly answer with me. Instead, I answered with, “I don’t know.” This was not an authentic answer, but rather one that I gave in angst because of the emotional nature of the dialogue and an unwillingness to readily identify with the realization that “one drop” was all it took.

Table 3.1 Transcript of the Pudd’nhead Wilson event overlaid with the heart rate data among the coteachers

<table>
<thead>
<tr>
<th>Time (hh:mm:ss)</th>
<th>Vignette 1: Discussion on Pudd’nhead Wilson by Mark Twain</th>
<th>Konstantinos (KA)</th>
<th>Matt (M-HR)</th>
<th>Christian (C-HR)</th>
<th>Leah (L-HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:01:57</td>
<td>(M-79)(C-88)(L-89) one thirty-secondth [C-87]/ *L repeats as question: one-thirty secondth?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>00:01:58</td>
<td>or something...</td>
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<td></td>
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<tr>
<td>00:01:59</td>
<td>(C-88)<em>KA laughing nervously</em>/L looks to C and asks, “Right.”</td>
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<td></td>
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<tr>
<td>00:02:00</td>
<td>(C-89)<em>KA laughing nervously</em>/L shrugs while saying, “I don’t.”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:02:01</td>
<td><em>KA laughing</em>/L: “know.”</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>00:02:02</td>
<td>So...<a href="L-90">C-88</a></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>00:02:03</td>
<td>Uh...<a href="L-93">C-88</a></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>00:02:04</td>
<td>right(M-78)[C-93]</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00:02:05</td>
<td>And</td>
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<tr>
<td>00:02:06</td>
<td>(L-95) So, at the</td>
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<tr>
<td>00:02:07</td>
<td>End when</td>
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<tr>
<td>00:02:08</td>
<td>Pudd’nhead Wilson(M-79)</td>
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<tr>
<td>00:02:09</td>
<td>Figures out</td>
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<tr>
<td>00:02:10</td>
<td>That [C-94]..because he uses</td>
<td></td>
<td></td>
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<tr>
<td>00:02:11</td>
<td>Fingerprints... [M-78]<a href="L-96">C-98</a></td>
<td></td>
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</tbody>
</table>
As Konstantinos summed up the story, the heart rates of Christian and Leah went from the high 80s to high 90s in the 19 second time interval. Even though there were no numerical matches in the heart rates of Christian and Leah, both of them shared the same rising pattern.

By running a reliability test (Cronbach alpha = 0.8), we confirmed that the pulse rate data for the 19-second event were dependable for use in calculating and making sense of statistical tests such as correlation coefficients. Pearson correlation coefficients showed that Matt’s heart rate negatively correlated with Christian’s (correlation coefficient of -0.8) and Leah’s (correlation coefficient of -0.7) heart rates. These coefficients, though negative, were statistically significant. Considering the negative correlations between Matt’s heart rate and that of his coteachers, his ethnographic narrative provides another perspective of the event.

Matt: I was torn, because I had a deep desire for the students in the class, who might never again get such an opportunity, to have open and honest dialogue, but realized that Christian, Leah, and I did not spend
much time considering how we could facilitate such a discussion [about the N-word and *Pudd’nhead Wilson*]. My lower heart rate may reflect my calm and removed contemplation at this juncture in time. I suspected that the class had heard these types of messages before and I really wanted for them to have an experience that allowed them to reach into unfamiliar territory, but I knew in order for that to happen there would need to be an invitation. But what were they being invited to? They didn’t know. Leah, Christian, and I have been considering race issues the better part of our lives and it was silly of me to expect that we would be able to create an altering experience for the current future educators in the room. I wanted to see educators given license to speak freely regarding race issues and I saw Leah and Christian as the gatekeepers to that license. I waited for them to include me and the others, but I knew that it was unlikely to happen because Leah, Christian, and I hadn’t gotten a chance to speak logistically about how to allow for that to happen. Nevertheless, the evening was special. I spoke with Konstantinos later that evening and what remains with me was his sentiment that “most of the students have not considered these matters very much, nor have they had a chance to hear these types of
firsthand accounts.” In retrospect, I wish that I had tuned into what Leah and Christian were saying rather than exhibiting a cold, removed contemplation. I wasted an opportunity to be tuned in with my colleagues during this important discussion.

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
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<th>(4)</th>
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<tbody>
<tr>
<td>(1) Seconds</td>
<td>1</td>
<td>-</td>
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<td>-</td>
</tr>
<tr>
<td>Seconds while Pudd’nhead story was being told</td>
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<td></td>
<td></td>
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<tr>
<td>(2) Matthew heart rate</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>.7**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Christian heart rate</td>
<td>.9***</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>.8**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Leah heart rate</td>
<td>.9***</td>
<td>.7***</td>
<td>.9***</td>
<td>1</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).

Looking at Figure 3.2, after 00:02:05 sec, Matt’s heart rate decreased while both Christian’s and Leah’s heart rates increased. Matt explained that his emotional energy was focused on the logistics of the presentation and having some doubts about preparedness, while both Leah and Christian valenced their emotional energy with empathy for Roxy. It was found that Christian and Leah had heart rates that positively correlated, with a correlation coefficient of 0.8 -- quantitative evidence for
an emotional contagion at the micro-level. According to Collins (2004), emotional contagion is only possible when people share a mutual focus of attention. “If they are focusing attention on the same thing and are aware of each other’s focus, they become caught up in each other’s emotions (p. 108).” In this case, Christian and Leah were both emotionally entrained in the explanation of the Pudd’nhead Wilson story, were aware of each other, and looked to each other while Konstantinos told the story and while he asked about what it took to be declared Black and thus a slave. The excerpts that follow below are from a cogenerative dialogue between the coteachers. They provide insights into how both Christian and Leah were reflecting on a thorny issue: differences in skin color and the realities of passing for or “acting” White.

Leah: I remember being conscious of Christian being what I would describe as “light-skinned” as am I, and while hearing the story of Roxy’s decision in the novel, I couldn’t help but think about what Christian might be thinking about the idea of “passing.” For myself, I thought of the pressures of “passing” and how it is easier for some compared to others.

Christian: The nature of this book, which I hadn’t read, had some kind of relevance to me, but not on a
personal level. I was recalling in my memory how it feels to appear as “other” and to desire to be accepted by others from a racial perspective, inside and even outside of my race.

Christian and Leah both felt kinship for the main character of the story:

Christian: ...when I think of the idea of being “mixed,” I think in my mind how many people may go through some kind of identity crisis - asking questions like “I don’t know who I am ...” These kinds of things blew my mind while Konstantinos was describing the story.

Roth and Tobin (2010), claim that synchronous alignments can be understood as resources for solidarity and agreement that people experience. They argue that alignment in gestures and prosody is produced by the anticipation of the participants in the social encounter. Two people who synchronize with each other have to anticipate each other’s movement. As Tobin (2006) suggested, solidarity is more frequent within a community when positive emotional energy and mutual focus is shared by all the members. For example, people who live closely together and share a similar social experience, can identify and anticipate better the subtle
gestures and signs of people of their community. Therefore, synchrony should be more frequent among individuals who relate to one another or live in the same community. Furthermore, it is possible to understand this solidarity as a form of compassion. We argue, in this study, a differentiation between empathy and compassion; empathy being the ability to know what people are feeling and compassion, being related to emotional contagion, is the emotion that arises when someone is witnessing someone who is suffering and identifies with it (DeSteno 2015). If we understand the relationship between emotions and physiology as dialectical, then we argue that showing compassion has a physiological impact that can be traced through heart and pulse rate readings, which can be measured with instrumental tools like oximeters.

**Vignette 2: Christian’s position about the N-word**

Following the *Pudd’nhead Wilson* vignette, Konstantinos asked Christian and Leah to express their own opinions about the N-word to the class.

Christian: I started to explain my position from a genealogical perspective. I felt that the class was a safe space to open up in. I felt I was in a trusting climate to expose my personal point of view. I understood that it was a good chance to share my perspective because I know my ancestral lineage, and I could show the
historical connection with the past and its link to the N-word. My family history goes back to the time of the Civil War. About twelve years after its conclusion, my great-great-grandfather was born and he was a farmer in North Carolina. It is logical to believe that he was a child to former slave parents. He became a minister, travelling from farm to farm, town to town, to eventually bring his wife and five children to White Plains, NY, to ultimately found a church in Brooklyn, NY, which still exists today and that my family and I continue to attend. His church, like several others in Brooklyn during the late 1800s, early 1900s, would serve as a place of refuge to receive Blacks moving from the south who wanted to begin new lives in the north. The church itself is part of my family history, making it a historical repository of my lineage since every one of my family members served and/or attended my great-great-grandfather’s church. While I am fortune to know where I come from and am able to determine how far back my family goes in the U.S., I walk with the mindset to reject any derogatory language like the N-word. The suffering and challenges people like my ancestors had to endure are ingrained in me; it isn’t possible for me to glorify or even use any form of the N-word because of the knowledge I maintain. It is
valuable to others to know of my story because many people never had the experience of meeting somebody who can trace their lineage so far back in American history. My perspective is unique in that it brings a historical and personal connection to a modern day discussion. My intentions are to share my story with other people in discussions like this so that they may know that the N-word is hurtful and insensitive to people of color. Stories like mine are important and deserve to be shared so that the youth and young adults of this world can realize that we cannot forget, reject, or ignore our past. We must reflect on it in order to become better people by understanding the way certain individuals interpret the N-word, and by not being so careless with any of our words.

In the cogenerative dialogue among the three coteachers after the presentation on race, Leah reflected on the significance Christian’s narrative had on her emotions, expressing one sentiment: that of “jealousy” for Christian’s ability to trace his family genealogy specifically to a time and place in American history and to see how, like in the Pudd’nhead Wilson story, his ancestors faired post-slavery. Leah felt a fictive kinship towards Christian as she was reflecting about her own familial narrative
compared to Christian’s: “that’s like me” she thought and expressed similar emotions to his.

Leah: During the presentation, I looked at Christian and began nodding my head as he spoke about his genealogy. I was emotionally entrained with his narrative and was linked by resonance to his words because of the close proximities of our two unique, yet similar, genealogies. I was thankful to be in the room with another person who had a history that linked to slavery in colonial America. My feelings of jealousy came from the fact that I never had an opportunity to meet my paternal grandparents; they passed before I was born, but I am thankful and fortunate for the tradition of oral history. Growing up, my siblings and I would sit with our father and mother to learn of the experiences my father and his family had as cotton-picking sharecroppers. My grandmother, Lola Pride, passed away in 1944, at the early age of 33, while giving birth in Snyder, Oklahoma. Dan Pride, my grandfather, passed away in 1975. The births and deaths of my father’s extended family are mostly approximations; there are very few birth certificates that are available for review. Some dates have been recorded in a family bible that passed
along from sibling to sibling, but is no longer around and available for review. To date, we believe that Dan’s grandparents were born prior to the time of slavery’s legal end. Lola, was a fair woman with brilliant, blue eyes. Her mother, Emma Johnson, was listed as a mulatto woman. When I heard the decision Roxy had to make in the *Pudd’nhead Wilson* story, I couldn’t help but look at my own hands and thought of my dad’s family in that very moment. My father’s “light” skin and blue eyes, donated to our gene pool by a White person, a slave master, we assume, has always been a topic of interest to people who meet us. One of the first questions we are asked is, “where is your family from?” They are confused by the eye color (which my siblings and I did not inherit), because it’s unusual to see a blue-eyed person with the physical features (e.g., skin color, hair color and texture) of a Black person from “here.” I, Leah Pride, am a descendent of Black American slaves from the United States of America. My father still reminisces about the long, hot days in the cotton fields of Oklahoma picking cotton side-by-side with his parents and siblings. These days were filled with extreme poverty. When I was much younger, knowing this little bit of history brought me some shame because, looking at our physical
characteristics, it was always a reminder that our ancestors were not allowed to experience the freedom we often take for granted, in the contemporary. I’ve struggled, knowing that a huge majority of my father’s family was poor and uneducated for much of their tenure as U.S. citizens, not necessarily because they wanted to be, but because there were difficult structures to transform as they lived and “worked” throughout: slavery, the Civil War, the Reconstruction-era with its Black codes, Jim Crow and segregation, the Civil Rights movement and integration, and today, the Black Lives Matter movement. The N-word was there throughout all aspects of these cultural-historical movements and so were we, the Pride family.

During this 15-second event focused on the N-word discussion, at (01:17), Christian started to explain his position about the use of the N-word in everyday life, especially, in regards to hip-hop music. While Leah was looking at Christian, with mutual focus, their pulses synchronized again as shown in Figure 3.3.

Their heart rates pulsed synchronously for three seconds (between 01:19 and 01:21), while he was talking about the N-word. It was also observed that Christian and Leah shared the same increase pattern for 15 seconds, while Christian was explaining
his disagreement with Kanye West’s usage of the N-word. The same microphysiological synchrony, between Christian and Leah observed during the *Pudd’nhead Wilson* event.

![Figure 3.3 Heart rate synchrony - the N-word event](image)

Leah: I was proud that Christian chose to condemn the use of the N-word in popular culture, though I too am guilty of singing along with some songs by artists that have capitalized on the word. I’ve watched the use of the N-word morph from a word used to commit violence and pain into a word that is meant to suggest friendship and kinship. I’ve never used the word to suggest this and find it offensive to suggest that the word could ever be used in that regard. As an educator, when I hear my students freely and casually use the N-word in my presence, I stop them and tell them the little I know of
my history and the link to abuse and violence. In the past, this was usually needed for the Black students who would casually use the word to each other, at times in anger and jest. Now that the N-word has crossed cultural boundaries into mainstream hip-hop, I find myself educating Hispanic, Caucasian, Asian, Black students of all ages about why such a word would be painful and offensive to a person with my history, even if it is in song. I know the N-word has been used violently against my family members while living in the U.S.; it had to be, because of where we come from. The “word” was a “name” to those people with my lineage. Now that I hear the N-word routinely and have to accept the contemporary meaning as fraternal, it is another turn in the cycle of abuse; and like my ancestors, I am expected to just accept the new meaning and newness of the “name” or fight against it. I am angry that an emotionally charged word, like the N-word, has been capitalized on and marketed, so that to the one who takes offense to it is characterized fanatical and antiquated.

Table 3.3 details a transcript of what was said during the 15-second event and how the heart rates of the three coteachers
changed over time, while Christian was giving his opinion about the use of the N-word.

Table 3.3 Christian sharing his thoughts on Kanye West’s (rapper) attempt to redefine the N-word

<table>
<thead>
<tr>
<th>Time (hh:mm:ss)</th>
<th>Vignette 2: Christian’s position about the N-word</th>
<th>Matt[M-HR] Christian[C-HR] Leah (L-HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:01:17</td>
<td>(M-83)<a href="L-96">C-97</a> years ago</td>
<td></td>
</tr>
<tr>
<td>00:01:18</td>
<td>In regards to (M-84)[C-96]</td>
<td></td>
</tr>
<tr>
<td>00:01:19</td>
<td>Hip-Hop and Rap[M-85]<a href="L-97">C-97</a></td>
<td></td>
</tr>
<tr>
<td>00:01:20</td>
<td>And their lyrics</td>
<td></td>
</tr>
<tr>
<td>00:01:21</td>
<td>And I[M-84]<a href="L-99">C-98</a> don’t agree with</td>
<td></td>
</tr>
<tr>
<td>00:01:22</td>
<td>Him either</td>
<td></td>
</tr>
<tr>
<td>00:01:23</td>
<td>Even though</td>
<td></td>
</tr>
<tr>
<td>00:01:24</td>
<td>He is <a href="L-102">C-99</a></td>
<td></td>
</tr>
<tr>
<td>00:01:25</td>
<td>Aware of</td>
<td></td>
</tr>
<tr>
<td>00:01:26</td>
<td>The history (L-103) and</td>
<td></td>
</tr>
<tr>
<td>00:01:27</td>
<td>Aware of the music</td>
<td></td>
</tr>
<tr>
<td>00:01:28</td>
<td>Industry and how (M-85)</td>
<td></td>
</tr>
<tr>
<td>00:01:29</td>
<td>You reach out to</td>
<td></td>
</tr>
<tr>
<td>00:01:30</td>
<td>The community</td>
<td></td>
</tr>
<tr>
<td>00:01:31</td>
<td>It’s a business</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.4 Pearson’s Correlations of Christian’s Sharing of Thoughts on Rap Music and N-Word

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Seconds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seconds during Christian’s sharing of thoughts on rap music and N-word</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(2) Matthew heart rate</td>
<td>.6*</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(3) Christian heart rate</td>
<td>.9***</td>
<td>.3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>(4) Leah heart rate</td>
<td>.9***</td>
<td>.5</td>
<td>.9***</td>
<td>1</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
*** Correlation is significant at the 0.001 level (2-tailed).
This event also had a strong Cronbach alpha coefficient of .8. Pearson correlation coefficients (Table 3.4) indicate that Matt’s heart rate did not correlate with his coteachers: the correlation coefficient with Christian’s heart rate is 0.3 and with Leah’s heart rate is 0.4. At the same time, Christian and Leah’s heart rates positively correlated with one another, with a correlation coefficient of 0.9. Similar to the emotional contagion observed during the Pudd’nhead Wilson event, the results suggest that Christian and Leah shared microphysiological synchrony, as observed by their shared heart rate patterns.

During this 15-second event, the ethnographic narrative, together with the oximeter data, provides some further insights about Matt’s emotional disengagement with the other two presenters as the session progressed.

Matt: I felt nervous about getting into the N-word conversation. I felt that I had some counter-positions to offer, but didn’t think that they would be received well, and so I chose to play it safe. I didn’t want to somehow trivialize what had been shared by Leah and Christian, though I felt there was more that could still
be shared. I recognized that I was an outsider in this conversation because of the color of my skin, but that also stung because I had wanted to share my own experience with racial ambiguity. I was never fully accepted by any group, because, though I was Puerto Rican, I didn’t look like I was, and though I was called “n**ga” in my teenage years, it didn’t appear to anyone that that would ever be the case. Honestly, I had some sense of jealousy that Leah and Christian were getting an opportunity to share their experience, laying bare the obvious reasons that they wanted to be a part of this session regarding race, but my own position regarding race was to be left largely unknown. I didn’t have a way of getting into the conversation. To the class, I thought to myself, “they may think that I could do this session as well as any other session.” The class didn’t realize that these issues regarding race, reconciliation, and restoration are my core issues. I sought out doing this session with Christian chiefly with the intention of creating an environment where meaningful dialogue could take place for those who often don’t get to speak. But to the class, I was the token White guy, there for posterity, in the race conversation. To me, the reality of why I was there couldn’t be further
from the truth. When we all sat to share our experiences, Leah and Christian were incredibly gracious and understanding. Clearly, I was still the outsider, but they dignified my position by hearing me while I heard them. The issues regarding race are indeed thorny and weighty, and have become quite complex. I am so grateful to Leah and Christian for taking a chance on working together. Martin Luther King once said, “we may have all come on different ships, but we’re in the same boat now.” It is as we work together and listen to each other that we become more synchronous.

Matt had the lowest average heart rate of the three coteachers (average heart rate of 84.0 with a standard deviation of 0.5). During the same event, Christian had an average heart rate of 98.0 (standard deviation of 1.1), and Leah had an average heart rate of 99.8 (standard deviation of 3.2). Considering these data, mutual focus and compassion emerge as two important keystones to understanding microphysiological synchrony. During the 15-second event, Leah is seen listening to Christian’s opinions about the N-word in the music field, so they were sharing the same focus. During a cogenerative dialogue that was held after the race presentation, Leah explained, that “even though there were some genealogical differences [between her and Christian], I can
understand exactly what Christian is saying about the history of the N-word and why it is inappropriate as a word in today’s culture.” From this statement, we interpret that Leah not only shared an opinion similar to Christian about the N-word, but also felt some of the same emotions shared by Christian during his response in the class.

Oximeters as a tool for emotional research in interaction

A multi-ontological approach is necessary when researching emotions in social interactions (Tobin and Richie 2012). This study is novel in that it has shown microphysiological synchrony occurring in the heart rate patterns of coteachers while participating in an emotionally challenging topic: race. Oximeters provide physiological data, in real time, that are useful in becoming more aware of emotions not otherwise obvious or visible during classroom interactions. Therefore, oximeters can be used to develop mindfulness skills that are desirable in promoting well-being (Davidson 2013). As Powetrzynska et al argue, mindfulness practices help students and teachers “to pause, zoom-in on the micro-situation and cancel out the cacophonic noise inside and around us and develop a sense of equanimity” (2014, p. 67) The combination of this technology within an interpretative participant centered research approach allows us to create richer
and deeper (thick) descriptions about what is happening and why, during event-oriented inquiry.

In this manuscript we argue that through the correlation of the heart rate data of coteachers (Leah and Christian) multiple events of emotional contagion were observed. On a micro-level, heart rates do not have to be identical to show signs of synchrony, but the pattern of change may be evidence of similar and synchronous emotional alignment. The emotional contagion, valenced in either the positive or negative direction, propagates the expectation that heart rate will change as well. Considering the data, emotional contagion is reflected in heart rate synchrony (positively or negatively correlated) and shifts. Additional research will provide deeper understanding and implications of physiological patterns of emotional alignment and synchronies.
4. An Autoethnographic Account of Heart Rate Synchrony in Teaching | Learning

Corinna: Before class even started, I sat in the lounge area of the Urban Education department here at The CUNY Graduate Center. I tried to pass through the crowds watching the Veteran's Day Parade so I can sit, and prep for the night’s class. I started doing the basic set up for the oximeters before moving the laptop, oximeter and my camera upstairs with me to class. It’s annoying to carry the laptop around but it isn’t much either. So, I carried the laptop open with me to class just to try and avoid having to do it all over again because I didn’t want to miss any minute of recording what’s happened in class. A classmate offered to help me bring my laptop and my bag for me to class.

Konstantinos Alexakos was my professor for Research Emotions in Teaching and Learning, a Fall 2014 course, at The CUNY Graduate Center. We both wore finger pulse oximeters in class as part of an emergent and contingent research that we were conducting on emotions in teaching and learning to monitor our heart rates (HR), blood oxygenation (SpO2), and heartbeat strength (PLETHY). Knowing I would wear a finger pulse oximeter did not make me feel anxious; I was able to feel how I would normally feel when I was not wearing an oximeter. There were more things to carry around in addition to the oximeters - the laptop, video cameras, and extra set of batteries just in case.

Corinna: I was actually pretty excited about this as Alexakos is my Dissertation Committee Chair and expressed in our meetings how comfortable he is with his students using oximeters in the classroom. I have worn oximeters before when I taught, but I was the only person wearing the oximeter. My curiosity was in what would happen when more than one person wore an oximeter in regard to research since we recently had discussions about emotional contagion, emotional climate, synchrony, and emotions. I didn’t know what to expect nor did I anticipate what the value of it could be.

On this particular night, I had issues due to lack of space on my external digital camera. I had only happened to record
twenty-two minutes of a two-hour course. So, I observed our HRs to look for similarities that were statistically significant using SPSS. I looked at the HR column on the saved oximeter data for both my HR and Alexakos’ HR. I found four minutes to be statistically significant, and then looked at the video. Both our HRs remained consistent—between 70 and 100 beats per minute (bpm). The interesting thing about this 4-minute event was that I was interrupted, or distracted, at many points during the four minutes. After getting over the embarrassment that I was actually conducting research when I was distracted while learning, it was important to touch on this matter as a teacher, a student, and a researcher. This study is grounded in Collin’s Interaction Ritual Theory (IR), Tobin’s Event-Oriented Inquiry, and Autoethnography.

For this study, oximeter readings were analyzed along with transcriptions of interactions that occurred in the video recordings of the data. Interactions here are the emotional affect that may be caused on part of the other during a discussion that you, as a participant, do not necessarily have to be actively engaged with in a social exchange (Collins, 2004). In this chapter, I argue that my HRs show a possible relationship with purposeful speech in teaching and learning.

**Multilogicality**

Tobin’s (2012) understanding of multilogicality is that research includes many lenses, many theories, and many understandings.
Bricolage is the use of more than one theory or framework to investigate research (Tobin, 2012). As finger pulse oximeters were worn by myself and Alexakos in the classroom, there are multiple ways to access this data simultaneously after finding salient contradictions to identify an event. HR synchrony was my starting point. In the oximeter data, I would look for similarities in our HRs. Out of curiosity, I was wondering if the HRs being similar could open the discussion in teaching | learning. The Sheffer Stroke, or vertical bar (||), is used for teaching and learning as I agree with Tobin in that teaching and learning have a simultaneous and codependent relationship that results from social exchange and interactions (Tobin, 2015). Oximeter Analysis, for this study, is grounded in AutoEthnography, Tobin’s Event-Oriented Inquiry, and hermeneutical phenomenological methods.

Tobin’s explication of Guba and Lincoln’s Authenticity Criteria (1989) argued bringing in voices of the participants to hermeneutically express their lived experience (Tobin, 2015). Hermeneutic Phenomenology takes this lens and purposely asks “what is happening?” and “why is it happening?” My role in my class was a student | researcher. I use the Sheffer stroke, or vertical bar (||), to emphasize both the duality and the oneness of my role as a learner, or student, in the class yet the person investigating HR synchrony in the classroom (Tobin, 2015). The challenge was to make myself aware and call attention to my emotional experiences.
in class. I was the focal point, and Alexakos would learn of how his positionality and purposeful speaking and choice of words impacted me—if it did.

I used the HR data readings to look for similarities and found that we had moments where our HRs matched. A four-minute interval revealed that our HRs were close in number of beats per minute (bpm) and that our HRs matched six times within that time interval which was how the events were identified in this study. Using Peter Waldman’s use of Van Maanen’s (2011) narratology, in this study, I have chosen to insert my voice throughout this chapter to inform the reader of how I experienced the moment as I was investigating the data, experiencing the moment in class, and/or writing that part of the chapter (Waldman, 2015). When my name is placed in front of the italicized text, the section refers to my thoughts detailing my emotional experiences on the day of the class. As I reflected on the event and recalled my emotional experiences in class, I questioned myself on my gestures and explicitly expressed my emotional experiences to offer insight to the reader (Waldman, 2015) as I am both a student and researcher. These are my lived experiences in the moment; recollection of these lived experiences brought awareness to what aspects of conversations on race made me uncomfortable. This study, and experience, also made me think about the power of my voice and how it should be used or how often I feel comfortable and safe amongst my peers and professor. As this
study requires my voice, the narratology is grounded in and adapted from Roth’s understanding of Auto-Ethnography (Roth, 2009). Roth views auto-ethnography as therapy, which I also agree with. His concern with auto-ethnography in research in social sciences lies in what auto-ethnographers do or not do, and how the generalized other is positioned. This study includes the other, Alexakos, and there is a transcript and video recording of what Alexakos was saying to us in class. I was able to reflect on my body language as seen in the video. My narrative provides the reasoning behind my actions and my beliefs and thoughts about race, my race, and conversations of race. My narratives provide the hermeneutical phenomenological methods detailing what happened and why it happened.

**What happened each minute?**

While looking at oximeter readings, I started to look for possible similarities between both my and Alexakos’ HRs. Our HRs were in the normal range of 70 to 100 beats per minute (bpm), so I started to look at different time frames if there were any similarities between our
HRs. With only the first 22 minutes of the class recorded and saved on video, I started looking at time periods where our HRs matched. I found four minutes where our HRs were very similar and in normal range as depicted in Figure 4.1 and plotted them on a graph. Using italicized font, I intend to discuss how I felt about Alexakos as a professor during that session and how I feel overall about Alexakos as a professor and dissertation advisor, which will provide insight on how I felt both during the event and about the professor overall, which potentially have been causal to the teaching and learning experience, thereby making this study autoethnographic. The italicized font is used to show my thoughts and feelings of the event without disturbing the flow of the study, which can distract the reader (Van Maanen, 2011).

Prior to the class meeting that night, I prepared the laptop to be able to collect data from two oximeters along with two screenshots of video from the laptop to be interpreted later on. Alexakos had set up his own camera on the end of the classroom as well. I did not look at the screen once everything was set up. Instead, I just participated in the class as I would without trying to notice the oximeter. However, I did have to make sure the computer was still able to record me and that the screensaver did not get activated. I recorded each class.
Starting with a macro-level lens, the oximeter readings from the entire two-hour class showed that there were thin coherences (times where our HRs were not the same) and thick coherences (times where our HRs were the same) that both seemed salient for oximeter readings to be used as a method in research (Sewell, 2005). Building on Geertz’s understanding of culture not ever being any single one but a collective group of cultures different from each other, Sewell’s theory of culture comprised of making meaning of the differences (Sewell, 2005). Thin coherence highlights our different HRs, in this case, and thick coherence marks the similarities (Sewell, 2005). During each of the thick coherences, which I refer to as events, I argue I was emotion-sharing with my professor, otherwise known as emotional resonance (Decety & Meyer, 2008). The four minutes represent, on a meso-level, a thick coherence I selected from the oximeter readings from the entire two-hour class time. Within the four minutes, I discovered more thick and thin coherences as depicted in Figure 4.1 where the dotted lines show my HR and the solid line shows the

![Figure 4.2 6 Moments where HR matched](image-url)
HR of Alexakos. I used that to look at the events that occurred within that timeframe which are marked in Figure 4.2.

I chose to explore the thick coherences only during the four minutes, as shown in Figure 4.2, where there were six specific events that align with video recordings from the class. Within the four minutes, there were seventeen moments where our HRs crossed, but that does not mean that our HRs matched at all of those points. According to the transcription of the video recording in Table 4.1, in the appendix, there were six marked, and identifiable, events where our HRs matched on the oximeter screens. This evidence showed that with both our HRs increasing and decreasing, there were other moments where our heart rates intersected. The transcript in Table 4.1 allows insight on what happened in the class during the first minute.

<table>
<thead>
<tr>
<th>Time</th>
<th>What was said?</th>
<th>What was heard?</th>
<th>What Action was Done?</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:30:00</td>
<td>Alexakos: after years... (KA-81) (C-88)</td>
<td>Corinna was looking at Alexakos very focused</td>
<td>Alexakos very focused as eyebrows are lowered.</td>
</tr>
<tr>
<td>16:30:01</td>
<td>Um...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30:02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30:03</td>
<td>So I probably wanna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30:04</td>
<td>stay with Bahktin (KA-81) (C-86)</td>
<td>Corinna scratched her scalp and eyebrows</td>
<td></td>
</tr>
<tr>
<td>16:30:05</td>
<td>and then after that (KA-80) (C-86)</td>
<td>relaxed.</td>
<td></td>
</tr>
<tr>
<td>16:30:06</td>
<td>we’d be done (KA-79) (C-84). So this way</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30:07</td>
<td>you have some time (KA-79) (C-81) to do</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30:08</td>
<td>Uh... (KA-82) (C-81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30:09</td>
<td>whatever (KA-82) (C-79)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:30:10</td>
<td>else (KA-83) (C-79) that we (KA-83) (C-80) have</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
16:30:11 left.

16:30:12 Um. But, Bakhtin

16:30:13 talks a lot

16:30:14 about how

16:30:15 meaning

16:30:16 Created

16:30:17 in the in

16:30:18 betweens. So

16:30:19 whatever meaning

16:30:20 have you know

16:30:21 might have

16:30:22 created another meaning

16:30:23 between there. All those people,

16:30:24 you’ve seen them

16:30:25 They might have one

16:30:26 but then the meaning

16:30:27 between you and them

16:30:28 might be totally different.

16:30:29 ...and...

16:30:30 so

16:30:31 I find that very

16:30:32 mind blowing and

16:30:33 Again. This is probably one of the

16:30:34 first readings that I read

16:30:35 that I like. It’s easier to understand.

16:30:36 (KA-79) (C-78) So just take it.

16:30:37 (KA-79) (C-77) also

16:30:38 talks about laughter

16:30:39 and it’s filled
16:30:42 with things that are
16:30:43 Very
16:30:44 important (KA-77) (C-80).
16:30:45 At least in my work (KA-75) (C-80).
16:30:46 in my (KA-75) (C-81)
16:30:47 understanding.
16:30:48 So (KA-75) (C-82), take a look at that,
16:30:49 But
16:30:50 just the creating (KA-74) (C-82) of meaning.
16:30:51 So, for me (KA-73) (C-82)
16:30:52 Um (KA-72) (C-82)
16:30:53 I went
16:30:54 to... how
16:30:55 many of you know of
16:30:56 Aviation (KA-72) (C-79) high school?
16:30:57 Class
16:30:58 No? (KA-72) (C-78)
16:30:59 Right (KA-72) (C-79).

Corinna looked at KA and refocused on the class discussion.

Can you elaborate on what happened during this 1st minute?
Corinna: Hmm.. there’s always this sense of relief after successfully setting up the oximeters. You know? Seeing that the oximeters are connected and properly reading, and seeing the video of both of us on the computer screen. I try my best not to look at the computer during the class session so as not to focus on our heart rates to impact it if that is even possible. During this minute - there was like relief... Then, he goes into Bakhtin. I mean, at that time... I felt self-conscious about my level of recall about readings and authors because people can start talking about the reading and connect it like a citation mogul. So when he name dropped Bakhtin, I’m like ‘Boom! I know him... What do I remember? Crap... Drew a blank!’ so it makes sense that I start scratching my scalp. I’m glad my eyebrows look relaxed so I didn’t feel too bad about drawing the blank. Then, he continues to talk about Bakhtin. No one really jumped in to add to that part plus he was giving us extra time for doing our work whether it was for our research or for other classes. The class was a mixture of people taking non-matriculated credits and others were at different stages of their doctoral journey. I knew Fergie wanted to ask me about oximeters, but I didn’t think she’d ask me during the actual class. She was good though because she records the sessions anyway, but I got distracted. I thought to myself, ‘how am I doing this and not paying attention?’ I figured, okay, well, I may not actually use this session for research and tried to hurry up and pay attention again to Alexakos. It wouldn’t hurt if I didn’t drag out the conversation, right? So, I tried to give her the steps to set up and listen again to Alexakos.
Within the first minute, our HRs matched as Alexakos had talked about what we would learn from Bakhtin. According to Table 4.1, our HRs started in the 80s with mine at 88 bpm and his at 81 bpm. While his HR decreased more steadily, mine fluctuated a bit as my attention was taken away from the main discussion. Around this time, I was more concentrated on making sure I was collecting data correctly, as during the past few weeks, the data was either incomplete or the laptop did not have enough memory. When Alexakos dialed back on some of the readings required, I was thrilled and relieved which was where my HR began increasing again to 80. When Alexakos spoke about Bakhtin’s work, his voice started to lower when he expressed the importance of Bakhtin’s work and its influence on his own work. During that moment, I felt some of the passion as he asked us in the class to really try to absorb the ideologies expressed by Bakhtin as well. After our HRs matched, my HR slightly increased.

What do I remember experiencing for times when our HRs matched?

Corinna: Where our HRs match, I can’t say that I heard what he was saying at that time as I was focused on helping Fergie with getting her computer oximeter ready. I had just finished writing notes, rocking, and swaying. The movement looks to be the cause as to why my HR was increasing. I was no longer rocking and swaying when I was talking with Fergie, so it makes sense that my HR was decreasing.

In Figure 4.3 below, notice that just the second moment is highlighted. If you take an even closer look, you would see that this moment in particular has two points that match in the video, but you can’t really see that on the graph. During this particular
minute, our HRs not only matched but moved up closely together as you will notice in the transcript better than on the graph. The inner circle that has been outlined shows how close the HRs were. This class experience was very interesting to me from a researcher standpoint because I was tuning in and out of the lecture. I found that when I tuned in, certain words the professor spoke brought me back into the discussion. This particular minute, I remember hearing three words that you will come across in the transcript detailed in Table 4.2: “ROTC”, “race”, and “pushed”.

Table 4.2 Transcript of Second and Third Events Within the 2nd Minute

<table>
<thead>
<tr>
<th>Time</th>
<th>What was said? (KA: Alexakos’ HR)</th>
<th>What was heard?</th>
<th>What Action was Done?</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:31:00</td>
<td>Alexakos: (KA-72) (C-79) and that’s the…that’s Corinna focused straight ahead of her.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:31:01</td>
<td>the high school I attended</td>
<td></td>
<td>Corinna focused straight ahead of her.</td>
</tr>
<tr>
<td>16:31:02</td>
<td>when I was young (KA-72) (C-77)</td>
<td></td>
<td>Corinna focused straight ahead of her.</td>
</tr>
<tr>
<td>16:31:03</td>
<td>a long time ago (KA-72) (C-74)</td>
<td></td>
<td>Corinna focused straight ahead of her.</td>
</tr>
<tr>
<td>16:31:04</td>
<td>And</td>
<td></td>
<td>Corinna focused straight ahead of her.</td>
</tr>
</tbody>
</table>
16:31:05  it had the
Corinna focused on Alexakos right after hearing “ago”.

16:31:06  what I figured
Corinna focused on what Fergie was doing with oximeters.

16:31:07  just(KA-72)(C-76) by looking at the

16:31:08  parade(KA-74)(C-76) it(KA-74)(C-78) was that

16:31:09  this is the

16:31:10  ROTC(KA-76)(C-79)

16:31:11  kind of  Margaret: Yea

16:31:12  groups in the

16:31:13  in the

16:31:14  high schools(KA-74)(C-79) or middle

16:31:15  schools(KA-73)(C-81),

16:31:16  and(KA-73) (C-82) I mean(KA-72)(C-82)

16:31:17  it took me back to

16:31:18  that. But(KA-72)(C-83), also

16:31:19  just by looking at the

16:31:20  faces(KA-74)(C-83)

16:31:21  of who(KA-75)(C-82) was in the
Corinna refocused on Alexakos.

16:31:22  Parade

16:31:23  it(KA-76)(C-83) kinda

16:31:24  brings up a lot of

16:31:25  questions(KA-76)(C-84)

16:31:26  in terms of(KA-74)(C-84) race
Corinna was looking in Alexakos’ direction, but her eyes shifted left and right.

16:31:27  and(KA-74)(C-83)

16:31:28  

16:31:29  (KA-75)(C-83) Who

16:31:30  Who’s pushed (KA-77)(C-79) into
Corinna refocused on Alexakos.

16:31:31  certain things (KA-79) (C-79).

16:31:32  

16:31:33  Right? (KA-80)(C-80) Margaret: mhm
Corinna looked down.

16:31:34  I

16:31:35  Uh(KA-81)(C-80)

16:31:36  And so, you (KA-82) (C-80)...
Corinna straightened up in her chair, took a deep breath, and looked slightly in Fergie’s direction.
Corinna shifted in her seat again and remained looking down.

That’s why I was also looking down.

Corinna was still looking down.

emotions. Perhaps some of you noticed that you didn’t want to go there.

And it also brings up certain emotions. Corinna focused on what Fergie was doing with oximeters.

you know - Why does it also bring up certain emotions? okay Corinna looked down slightly towards KA.

Corinna refocused on Alexakos.

this kind of agenda for a certain group of people. Then other group of people have a different type of agenda or why should?

okay let’s be clear students of color should be

| 16:31:38 | (KA-82)(C-78)That’s why I was(KA-82)(C-75) also looking down. | Corinna was still looking down. |
| 16:31:39 | asking about emotions. Perhaps some of you noticed(KA-84)(C-75) that you didn’t want to go there. |
| 16:31:40 | And(KA-85)(C-75) it also brings up certain(KA-84)(C-75) emotions. Corinna focused on what Fergie was doing with oximeters. |
| 16:31:41 | society have | Corinna refocused on Alexakos. |
| 16:31:47 | this (KA-82)(C-75) kind(KA-81)(C-75) of agenda for(KA-83)(C-78) a certain group of people (KA-84) (C-81). Then other group of people(KA-84)(C-82) have a different type of agenda or why(KA-84)(C-80) should(KA-82)(C-80)? okay(KA-82)(C-79) let’s be clear(KA-81)(C-79) students of color should be |

**What about “ROTC” drew my attention?**

Corinna: ROTC, which stands for Reserve Officer Training Corps, caught my attention because one of my best male friends from high school talked very highly of ROTC. When I first met him, I thought he wasn’t cool. For me, he was too materialistic. After he was in ROTC, there was a humbler side of him as far as his demeanor, which made him cool to me. So, I had a positive experience with the impact of ROTC on their students in how it builds character. When I heard ROTC, it pulled me back into the conversation because I was curious as to what Alexakos would say about ROTC if anything and I had my own opinions I could share if prompted.

**What about “race” drew my attention?**

Corinna: Race, for me, is a tricky matter. When I heard the word “race”, my heart sunk to my stomach and my stomach felt really empty. My family is Garifuna, and our roots lie in St. Vincent and the Grenadines. This is the history of Garifuna people from Honduras and Belize. There are
Garifuna people also in Guatemala and Nicaragua. My family was born in Honduras. My grandmother’s family is from Belize. Our culture is Garifuna which means Black Carib. My mother raised me with the understanding that I am what some call: Black Hispanic or Afro Latina. I knew very well what my identity is. It would draw concern when I would be forced to choose one over the other. When you look at me, you see Black. I don’t look like what I quickly learned people stereotyped as Hispanic, which to me became the likeness of a Jennifer Lopez. So, in schools I’ve attended, I always sat with and was a part of the Black crew. When my last name would be questioned, I would lose my Blackness and be considered “Spanish”. I didn’t fit in with the “Spanish” crew even if I spoke it as well as they did and even danced the music. I then became the Black person that could translate if ever anyone spoke offensively in Spanish. After being insulted the first time by it, I became used to hearing it and shrugging it off never speaking about how it made me feel. So when Black movements would come up, I felt like I wanted a movement that reflected both identities. If I spoke on how I felt, I offended. It was never Black conscious enough or I was denying my own Blackness and only connecting to Hispanic roots. I would no longer want to speak because I felt misunderstood completely and denied the right to express how both are very important. In a flash, hearing the word “race” slapped this in my face.

What about “pushed” drew my attention?

Corinna: Pushed, since it came soon after hearing “race” further affected my own thoughts of race and I was afraid of where the professor was going with it. I did not want to be positioned to speak in the class about my opinions. I didn’t want to offend. I didn’t want to express anger, insensitivity, or emptiness on the matter. I was angered about the constant conversation on what’s happened wrongly to people and the fact that you have to bring it up for human compassion and get none of it. I was afraid of my current experience of my voice and/or voiceless-ness on the matter. I was saddened by my own lack of interest to partake in the conversation even though I had many emotions and thoughts on the matter. I wanted the professor to switch topics because I didn’t want to feel what I was feeling anymore.

I briefly spoke to Fergie about oximeters as she became interested in looking at her own HR readings. While we spoke, I was already not fully tuned into what my professor was even talking about. By the time Alexakos mentioned the word “race,” I had only caught that word and I felt like a deer caught in headlights because I did not even know why we were talking about race. I also saw it in my own facial expression during the video. My HR began to decrease steadily, which is what I saw as a contradiction, or
change in my HR (Sewell, 2005). This was the second event within the four minutes, according to Table 4.2 as well. By the time Alexakos said the word “pushed”, my HR dropped by four to 79 beats per minute (bpm) while his increased by two to 77 bpm. After his statement where he said, “Who’s pushed into certain things,” Alexakos followed that statement by taking a breath. Since I was not the speaker, I did not want to encourage the conversation either. So, my HR may have decreased as a result of that while Alexakos’ HR had increased because he was already making the utterances about such an emotionally charged topic. Alexakos and Pride coined these emotionally charged topics as thorny issues (Alexakos et al., 2016). Bakhtin expressed that each utterance had both value and meaning (Bakhtin, 1986). During that breath, our HR continued to follow closely in its increase from 79 bpm to 80 bpm. Alexakos’s HR went to 80 just before mine also went to 80. This time around, I leaned to Fergie to talk to her about oximeter software and set up.

*What made me so fidgety?*

Corinna: I was just so nervous during this moment and trying not to get looked at or called on to address this idea of being pushed into the military as a means of opportunity that I just have to do something else. I didn’t even think about being caught being rude by having my own conversation with a classmate during class, I was running from the discussion. Trying to avoid hearing or having another discussion on race without even thinking that the issue was more me than anything else. I wanted to not feel the pit in my stomach. I wanted to catch my breath. I wanted Alexakos to switch the subject because I wouldn’t dare try to switch a professor’s topic.

My only way out of feeling that way was to focus on another conversation, hence I opened my mouth and turned my attention to
Fergie. I, basically, distracted and interrupted Fergie’s attention in the class. In Table 4.3, you will notice that I just couldn’t stay focused on the conversation.

<table>
<thead>
<tr>
<th>Time</th>
<th>What was said? (KA: Alexakos’ HR) (C: Corinna’s HR)</th>
<th>What was heard?</th>
<th>What Action was Done?</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:32:00</td>
<td>KA: (KA-81) (C-82) marching in step (KA-80) (C-82)</td>
<td></td>
<td>Corinna focused on what Fergie was doing with the oximeters. They were still in side dialogue.</td>
</tr>
<tr>
<td>16:32:01</td>
<td>You know (KA-80) (C-85)...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:02</td>
<td>Basically almost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:03</td>
<td>everybody (KA-80) (C-87)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:04</td>
<td>In (KA-81) (C-87) that parade (KA-81) (C-85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:05</td>
<td>was someone of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:06</td>
<td>color (KA-81) (C-82).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:07</td>
<td>Um (KA-81) (C-79)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:08</td>
<td>The fact when you said (KA-81) (C-81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:09</td>
<td>‘Ay um... Like...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:10</td>
<td>I didn’t see them (KA-81) (C-82).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:11</td>
<td>Right?</td>
<td>Corie laughing</td>
<td></td>
</tr>
<tr>
<td>16:32:12</td>
<td>That must’ve came out with laughter-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:13</td>
<td>Didn’t it?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:14</td>
<td>Class [<em>inaudible</em> (KA-81) (C-84)]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:15</td>
<td>Class [<em>inaudible</em> (KA-81) (C-78)]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:16</td>
<td>Yea (KA-82) (C-78)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:17</td>
<td>And (KA-82) (C-74) so (KA-84) (C-74),</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:18</td>
<td>Well it’s (KA-84) (C-72) rather interesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:19</td>
<td>To see how (KA-84) (C-76) this</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:20</td>
<td>Happened (KA-85) (C-76)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:21</td>
<td>And the kind (KA-85) (C-79) of emotions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:22</td>
<td>That...that have come up (KA-85) (C-82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:23</td>
<td>Because then (KA-83) (C-82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:32:24</td>
<td>At the same time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Text</td>
<td>Analysis</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>16:32:25</td>
<td>Crossing(KA-83)(C-85) the street(KA-82)(C-85)</td>
<td>Corinna refocused on Alexakos.</td>
<td></td>
</tr>
<tr>
<td>16:32:26</td>
<td>You have to deal(KA-82)(C-91) with the</td>
<td>Corinna looked at the computer that was recording the class and oximeter readings live.</td>
<td></td>
</tr>
<tr>
<td>16:32:27</td>
<td>Barricades(KA-81)(C-91), you have to deal with the</td>
<td>Corinna looked down when Alexakos said “cops” while nodding her head in agreement.</td>
<td></td>
</tr>
<tr>
<td>16:32:28</td>
<td>Cops (KA-81) (C-92).</td>
<td>Corinna looked down when Alexakos said “cops” while nodding her head in agreement.</td>
<td></td>
</tr>
<tr>
<td>16:32:29</td>
<td>There was(KA-81) (C-89) somebody who</td>
<td>Corinna remained looking down</td>
<td></td>
</tr>
<tr>
<td>16:32:30</td>
<td>Assumed(KA-82) (C-85)_uh</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:31</td>
<td>Very correctly(KA-82) (C-83)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:32</td>
<td>I think – that(KA-81) (C-83)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:33</td>
<td>Was a</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:34</td>
<td>Professor(KA-81) (C-81) here</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:35</td>
<td>Who</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:36</td>
<td>She(KA-81) (C-83) fit(KA-80) (C-83) the stereotypes</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:37</td>
<td>Of(KA-80) (C-84)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:38</td>
<td>White(KA-79) (C-84) female</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:39</td>
<td>Dressed(KA-79) (C-82) like an academic(KA-77) (C-82)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:40</td>
<td>You(KA-77) (C-81) know</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:41</td>
<td>And she wanted to Cross the</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:42</td>
<td>street(KA-77) (C-83) so the cop said</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:43</td>
<td>Nope. You can’t cross</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:44</td>
<td>&quot;sound effect :vroop:&quot;</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:45</td>
<td>She’s like, “Why you pushing (KA-78) (C-83) me?</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:46</td>
<td>Why you pushing me?</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:47</td>
<td>It’s like(KA-78) (C-84)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:48</td>
<td>Something you don’t do</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:49</td>
<td>You know(KA-78) (C-85)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:50</td>
<td>Whole bunch of cops around</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:51</td>
<td>You know. Keep(KA-77) (C-85)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:52</td>
<td>Moving</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:53</td>
<td>But the whole(KA-77) (C-86)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:54</td>
<td>Experience(KA-79) (C-86)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:55</td>
<td>Uh(KA-83) (C-86)</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:56</td>
<td>I wasn’t(KA-86) (C-86) wearing</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:57</td>
<td>My oximeter</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:58</td>
<td>um (KA-86) (C-88)... you can see it now, right?</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
<tr>
<td>16:32:59</td>
<td>It’s (KA-88) (C-85) uh...</td>
<td>Corinna did a hard blink then leaned in to write on her book</td>
<td></td>
</tr>
</tbody>
</table>

What happened during this minute?
Corinna: Goodness... I couldn’t believe we were still talking about race there. I was talking to Fergie up until he mentioned “color” and I had
started to refocus on Alexakos again. Which is where I see that my HR dropped to the 79 by the next second. That’s interesting to me because I noticed when I started wearing oximeters on my own to get used to it. I was either super relaxed or getting angry when my HR would be in the 70s. My HR went back up to the 80s for the few seconds as I focused on Alexakos, but it’s interesting that it’s almost like I was fidgeting over the next 11 seconds. I find it interesting that while I was going back and forth between focusing on Alexakos and looking at what Fergie was doing, my HR stayed in the 70s. That’s just how uncomfortable I was with the discussion even though I looked outwardly okay. I mean I knew I could talk if I wanted to and that there was nothing wrong with listening. As Alexakos was sharing the experience about the “dealing... cops”, my HR went up to 91 and 92 bpm. I more than likely had something to say because when he said cops, I nodded while looking down. I had something to say but didn’t want to speak. I needed to address my thoughts somehow. So, I started looking back and forth to the computer. More than likely, I wanted to search something on the internet or quickly check an e-mail but didn’t want to stop the screenshots from collecting and recording data. So, I wrote in my book. It couldn’t have been notes because this was still anecdotal and had nothing to do with readings.

What happened when Alexakos mentioned ‘color’?

Corinna: It was like I could hear him now better than I had wanted to. I started to think about all my relatives who went into the military to run away from home situations and be able to prove to themselves that they could make it for themselves. I thought of how my mother graduated from college but still went into the Navy. She was to be deployed to Germany but didn’t because right before being approved for deployment - they found out she was pregnant with me. My mother had refused to give anyone in her family rights over me because she wanted to take care of me herself. She couldn’t stay in the military after that.

Alexakos continued the conversation, as detailed in Table 4.4, sharing the story of his colleague’s experience with a cop. The professor expressed self-awareness of how he felt shivers while recollecting this event and knew that his HR would be a little higher than expected. Alexakos, at that moment, was very mindful and aware, and called me on it as I was a student-researcher looking at oximeter data (Powietrzynska, 2014).

<table>
<thead>
<tr>
<th>Time</th>
<th>What was said?</th>
<th>What was heard?</th>
<th>What Action was Done?</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:33:00</td>
<td>KA: (KA-88) (C-85) Right?</td>
<td>Corinna wrote in her book.</td>
<td></td>
</tr>
</tbody>
</table>
Where am I at, uh, Corinna?
Corinna looked up at the computer and scratched her head.

I'm at 88.

Corinna: Yup.

Just going back to the Experience and I know the kind of things that you tend to box. I think there's meaning. I talked about how it's created.

Corinna wrote in her book. Corinna refocused on what Fergie was doing with oximeters.

Corinna focused on what Fergie was doing with oximeters.

Corinna rocked her head back and forth.

Based on our past experiences and our past experiences. And our experiences. I mean it's funny feelings and shivers. Going straight to the back of my neck. Continuously. Um.

And how it's meaning and it's emotions. So, I come in. Christine is downstairs. She's like, 'oh you know.' I want to talk. Whatever, whatever. I'm like.
Corinna looked up at Alexakos. Corinna’s eyebrows went up while eyes wandering a bit.

And then (KA-74)(C-81)

Who was it? Of course I see

Caitlyn there.

Who’s like’

‘oh (KA-74)(C-82) I (KA-75)(C-82) want to talk to you if you don’t mind’

Of course (KA-74)(C-83)

it doesn’t matter

You know (KA-75)(C-82)

I got to put down my own work (KA-74)(C-80)

So I start laughing

And (KA-74)(C-77) then my mood changes laughter in the classroom from classmates.

Right? (KA-74)(C-76) So.

All this (KA-75)(C-76).

As we look (KA-76)(C-78) at it

As researchers (KA-76)(C-77)

I mean

We can say (KA-76)(C-79), ‘okay…’

What happened during this minute?

Corinna: I was still fidgety as class went on, but my HR didn’t go back up 90 bpm thankfully. It wasn’t until I laughed that my HR went back down to the 70s. I started writing notes because Alexakos was getting back into talking about meaning making and emotions. Towards the end of the minute, he was getting into researching with emotions. He pulled me back into class by asking what his HR was causing me to respond and it made me pay more attention to what was going on. He made me alert and it made me feel okay with looking at the computer at my HR once in a while. My HR was already in the 80s as I was writing in my book. Alexakos asked me his HR and looked at his oximeter and I looked as well where, just after, my HR went up to 87 and his went down to 87.
In the fourth minute, Alexakos wrapped up the conversation by reconnecting with Bakhtin’s ideas of the creation of meaning through experiences. Although in the earlier portion of the minute we matched at 87, he continued to talk about his internal changes (as he was experiencing them) as he relived the experiences he shared with the class.

**Disrupting a Thorny Issue**

This four-minute event uncovered how I react, in a disruptive manner, in a classroom when a thorny issue that I am uncomfortable with is brought up in class. Thorny issue is a phrase used to describe an emotionally charged topic for discussion wrought with pain and suffering that is brought up in a learning environment for a potentially transformative experience (Alexakos, Pride, Amat et al., 2016). In this study, the word “race” triggered emotions for me because I have had experiences where others would quickly validate or invalidate my voice and my identity on the matter based on how they viewed my position as an Afro-Latina, which affected how I would identify myself. As Alexakos continued to talk about the number of people of color in the military, as he said it in the transcript, it highlighted opportunity and access or lack thereof. Gloria Ladson-Billings’ Culturally Relevant Pedagogy (CRP) (1995) argued that teachers who are successfully culturally relevant and support the success of minority students produce students who are more successful in schools and challenge social
order of the existing state of affairs, which is an extension of her argument for Critical Race Theory (CRT) of education (1995). This CRT of education, similar to the CRT found in legal scholarship and defined originally by Derrick Bell in the 1970s, sought to provide a framework of research in education for analysis of racial inequity in the United States—human rights being below property rights, and the two positions combined, which has history, leading back to the Frankfurt School in Germany and DuBois (Ladson-Billings, 1995: Martinez, 2015). Alexakos practices CRP in his way of teaching and takes opportunities to open these discussions in his classrooms as he presents thorny issues as topics of classroom discussions, in his research, and in helping his students research emotions in teaching and learning. CRP has three theoretical underpinnings: how culturally relevant teachers view self and others to promote academic success and transformative learning; how culturally relevant teachers structure relations between themselves and students and build a community of learners to make room for collective connected learning; and how culturally relevant teachers view knowledge and how it emerges and develops (Ladson-Billings, 1995). My narrative was used to explain not only what happened but to also give my voice authority as I am a participant-researcher in this study. Through my narrative, the intent is both hermeneutic, in that I need to explain what happened and why it did, and self-reflective, in that through researching
the experience, it may be transformative as I am now aware of my response to race being discussed and could be more aware when thorny issues are discussed in the future, thereby partly making this study a bricolage. Bricolage is using multiple methods to offer an authentic historical account of my way of seeing and creating knowledge in this study for both myself and in general (Kincheloe, 2011). My narrative offers a view as my former, or past, self, and this research expresses the transformative nature of this study through reflexivity. Applying Collins’ IR Theory, there are two Interaction Ritual Chains (IRCs) that are occurring. Alexakos is the professor in the course viewed as the expert sharing his knowledge to his students on researching emotions. The second interaction is between myself and Fergie, where at first, I didn’t really want to participate, but I found myself initiating disruptive behavior. While I view Alexakos as a culturally relevant teacher, Kincheloe’s Critical Pedagogy allows for a broader discussion of culture and power and the effects on marginalized students (Bayne, 2009; Kincheloe, 2011). I argue that both frameworks apply for this study as the topic shifted to race and limitations and opportunities, which is the part of the conversation where I expressed the most discomfort. I was aware of my discomfort and responded to it by writing in my book, talking with Fergie, fidgeting, and looking around. Alexakos speaking about it did not make me feel threatened. Alexakos is a relatable
professor who sets the energy and environment of his classroom. He does try to encourage each student and their voice in the class, so I would say the class was a literal “safe” space to me (Alexakos, 2015).

What happened to my voice?

There was a parade going on outside prior to class starting. I work a few blocks away from there. I walked through the people to the school building I needed to be in without looking at the people in the parade. I remember looking at the people watching the parade as I walked and thinking that it was cool that families would go to watch the parade together. From my narrative, culture was based on solidarity by race, and power was reflected in lack of capital - be it social or economic. My narrative made me aware that while I identify as Black Hispanic or Afro-Latina, I still had taken away the importance of my voice in discussions on race. I lost my voice and I didn’t realize how important that was. I know that I did not write how I felt about that part of the discussion when I was writing in my notes, because I had refused to be a part of the discussion in general and for myself. My classmates did not jump in to make a point either at that part of the discussion. Now looking at the narrative, remembering how I felt, I question if I needed to really say something at that moment or just call myself to be aware of it. What would be more beneficial for me? Writing this chapter is more difficult than I thought it would be because
it calls for this level of truth about a thorny issue that I would never had voiced in any other way. I know who and what I am, and I am confident in that manner; however, in discussing race, I almost feel helpless. No, not almost. I am helpless. I don’t know what to do, so it is hard for me to talk about something I don’t know how to make an impact on.

How my ontology transformed through being aware

My views on how to include my perspective with others when it comes to race were questioned, and this research put me in a position to write through it. This paper serves as an empowerment tool for me to not cut myself out of conversations of race. If I have something I find of value to say in a conversation surrounding race, I will say it like in any other type of dialogue. Prior to this investigation, I thought I was in a good enough place to start talking if I felt like I wanted to hear or speak about race. This experience allowed me to acknowledge that while I know who I am and had long validated and accepted myself, I did not always feel right expressing, even in a safe space, who I was to another person or group of people. Even in a safe space, I face having to defend or prove my identity by either speaking the language or describing something native. It gets tiring and is offensive when the person asking you for such proof is also from the same country. Now, I am thinking about how to address these thorny issues even in a safe space. If I am in a conversation where I have the potential of
feeling offended or unaccepted regarding how I define myself, I am in a place where I can push back and openly discuss it if I want to. Is it okay that I may not want to? Do I always have to speak? Is my voice always necessary? Being strong in who I am does not require me to always speak in a conversation about race. From this study, I have learned that what I need is to be comfortable being a listener in the conversation too.
5. Toward a Theoretical Framework of Emotionally Adaptive Pedagogy

The need for a theoretical framework of Emotionally Adaptive Pedagogy (EAP) arose in relation to teacher burnout, emotional contagion, and emotional synchrony in classroom discussions via thorny issues and being mindfully present when analyzing Kenneth Tobin’s work with oximeters (2012; 2015), cogenerative dialogues (2000) and heuristics (2006), Konstantinos Alexakos’ work on fictive kinship (2011), heuristics (2015), and authentic inquiry (2015), Joe Kincheloe’s work on criticality (Bayne, 2009), Malgorzata’s work with heuristics (2014), Tobin, King, and Ritchie’s work on the validity and reliability of self-reporting methods (2016), Albert Bellocchi’s work on emotion diaries in online classrooms (2016), Leah Pride’s work on autoethnography and teaching | learning (2018), Arnau Amat’s work with me on heartrate (HR) synchronicities (2016), Olga Calderón’s work on oximetry (2014), and my own research using oximeter analysis in teaching and learning as contributions in the research on emotional state of being. In our research, knowledge, or ontology, has transformed through the experience of recalling emotions during the event as it is happening or right after. In a place where emotions can tend to be overlooked, a theoretical framework that asks participants to be mindfully present in their emotions is needed in hope to promote emotional wellness and awareness of emotional state as
they are teaching and learning, whether it be using a heuristic, wearing an oximeter, or observing facial expressions.

I developed an interest in research of emotional experiences in teaching | learning after reading an article that argued for CRP as a framework grounded in Ladson-Billings’ Critical Race Theory (CRT) (2005). Ladson-Billings argued that there was a lack of research and curricular attention to academically support African-American students in classrooms. This chapter elaborates on why a theoretical framework for EAP is needed in education research, what EAP is, and how EAP can contribute to education research while also focusing on some of the history of research in emotions in education. EAP argues that there is a lack of research on emotional experiences and emotional state in teaching and learning and a lack of ethical attention in supporting both teachers and learners on being mindfully aware of their emotional experiences in teaching and learning.

Why Theoretical Framework is Necessary for Emotionally Adaptive Pedagogy?

Learning, the result of social interactions, comprises of a coexisting relationship between teaching | learning (Alexakos, 2011). A Sheffer Stroke, or vertical bar (|), is used to represent the dialectical nature of teaching and learning as either can occur simultaneously during interactions (Tobin, 2015). Collins’ Interaction Ritual Chains (IRC) aids in identifying the properties
of the interaction between the self and other (Collins, 2004). These interactions that are between the physical self and other, internal or with other physical beings, have dialogues that generate meanings emotionally (Collins, 2004). As teaching | learning also occurs outside of the traditional classroom setting, teaching | learning spaces are learning environments that aim to be academic “safe” spaces. Teachers and learners engage in emotional experiences caused by discussing thorny issues for both teachers and learners where central ideals are challenged (Alexakos et al., 2016), working on challenging assignments, or working on challenging subjects and tackling the overshadowing beliefs of the majority in academic “safe” spaces (Alexakos, 2015). Research on the relationship between the emotional experiences during these moments of tackling challenges in academic “safe” spaces for participants and teaching | learning is lacking.

My research began with the use of finger pulse oximeters in the classroom, as a mindfulness-based tool, to investigate the emotional state of the self and other as physiologically expressed through the heartrate while teaching | learning. My investigation of participants wearing finger pulse oximeters in academic safe spaces revealed emotional experiences during challenging tasks and discussions. Finger pulse oximeters are often used in the medical field to read the heart and were used in learning environments to investigate the relationship between emotional state and teaching
learning in academic safe spaces. Researching the emotional experiences of participants contributed to my reflecting on my own experiences in teaching while I wore a finger pulse oximeter. Alexakos and Pride (2016) referred to thorny issues, such as race, as difficult and challenging subjects that can result in experiencing strong emotions.

In the three investigations I conducted, each learning environment was an academic space where a thorny issue was the topic of discussion in the class—gender and education was a topic being presented in the first investigation, race and veterans during a class session held on Veteran’s Day in the second investigation, and race and education was a topic being co-presented in the third investigation. The first investigation was of Petra, who was co-presenting on the topic of gender and education with two of her classmates and recalled feeling anxious about leading an interactive conversation. During the study, getting peers or classmates to participate in the discussion and being understood caused more of the anxiety than her confidence regarding the content knowledge. The second investigation where Alexakos and I wore finger pulse oximeters revealed my discomfort on discussing race as Alexakos reflected on veterans and race. The emotional experience brought on a lot of reflection, in that I had to talk about what I felt, how I felt, and why I was doing what I saw myself doing in the class in those moments. The third
investigation was of Matt, Christian, and Leah, who were co-presenting on race and education while each person was wearing a finger pulse oximeter. In investigating synchrony and emotional contagion, each person detailed how the presentation went for them, their positionality, and their feelings on speaking on interjected points the teacher had brought in for discussion. The emotional experiences made it evident that there is a need for a theoretical framework that unifies the body of research on emotional state in teaching | learning using mindfulness-based tools and practices.

Mindfulness is being present in the moment where the goal is to be aware of all of the emotions as they are experienced (Tobin, Powietrzynska, & Alexakos, 2015). Awareness is the bridge between understanding and being present with what is happening in the mind and body as it is happening and is necessary for mindfulness. Mindfulness is an act of awareness brought about through the use of tools and reflection. Using mindfulness-based tools and practices posits the researcher as supporting the notion that emotions affect our physical health and well-being, which is backed by studies done in neuroscience (Powietrzynska, 2014).

Studies that have involved mindfulness-based tools like oximeters in learning environments have shared the following three concepts: knowledge was transformative; awareness arose; and significant events revealed emotional experiences (Amat et al., 2016; Tobin, 2015, 2016). These mindfulness-based tools include
finger pulse oximeters, heuristics, clickers, and video recordings. Mindfulness-based practices include cogenerative dialogues, narratives, emotion diaries, meditation practices, and writing exercises. Through the usage of cogenerative dialogues, heuristics, emotion diaries, and narratology, mindfulness-based tools and practices promote emotional state in teaching | learning.

EAP presents a theoretical framework for researching emotional state in teaching | learning that incorporates multiple theories and multiple methods known as the multi-method or multilogicality. Multilogicality, as Tobin (2015) explicated it, is bringing in many of the researcher’s lenses to the forefront. EAP also lends itself to bricolage, as coined by Kathleen Berry and Kincheloe (2004), because it does not aim to look for one solution to solve a problem but uses multilogicality to highlight the contradictions that emerge in the research (Tobin & Steinberg, 2015). Cogenerative dialogues and narratives are two types of methods for collecting data on transformative knowledge and awareness. Cogenerative dialogues are discussions had in a safe space to share what happened in as much detail as possible on a video vignette capturing a snippet of the class session (Bayne, 2007). Safe space is an area that has a sense of security, protection, inclusion, and compassion. In learning environments, the responsibility of the teacher is to protect learners during social interactions which can, at a moment’s notice, turn
threatening and unsafe (Boostrom, 1998). An academic safe space encourages opportunities to engage in interactions where disagreements may occur and overshadowing beliefs tackled, thereby promoting learning while emotional experiences occur (Gayle, Cortez, & Preiss, 2013). Even if students and teachers feel safe in the classroom, emotional experiences arise, and there is a lack of research on how learning and one’s emotional state are supported during such moments.

Hermeneutic Phenomenology and Event-oriented Inquiry ground research that incorporates mindfulness-based tools and practices used in investigating emotional experiences in academic safe spaces. Hermeneutic Phenomenology is the exploration of events through the perspective of the person who experienced it and why it happened (Roth, Tobin, & Zimmermann, 2002). Tobin (2012) has used Sewell’s idea of thin and thick coherences as it applied to culture to explain events because they highlight contradictions and rely on social interactions, which led to investigations prompted by an event to be identified as Event-Oriented Inquiry. Culture forms by nuanced contradictions to thin coherences that stemmed from practices and representations and thick coherences that deviate from the norm (Sewell, 2005). Understanding the culture of the learning environment and the impact of the emotional experience from the perspective of the person who experienced that is necessary in understanding teaching | learning.
What is Emotionally Adaptive Pedagogy?

EAP attempts to hermeneutically investigate emotional experiences in teaching | learning during moments even when it is not visibly or outwardly expressed and is a call to being mindfully present while teaching | learning. Emotional experiences go unaddressed and overlooked, when visibly unnoticeable, or are not seen or understood as urgent. Emotions that are extreme or difficult are often taken to school counselors. While schools do offer counseling, the constant interactions that happen in a classroom provide opportunity for a vast amount of emotional experiences to occur brought on by what was said, heard, and/or thought about at any moment. Guba and Lincoln’s Authentic Inquiry (1989) brings the voice of the participants into research as a truth since it is a lived experience even if it contradicts or coheres with the viewpoint of the other. Research on emotional wellness and emotional state in teaching | learning is therefore emergent, contingent, and dynamic (Tobin, 2015). Emotional experiences are investigated in researching emotional experiences to further investigate teaching | learning. In asking participants to recall their emotions, participants need to be mindfully present and maintain awareness of the experienced emotions. Emotional experiences are ever changing and evolving, so truths may evolve as well as impact ontologies (Tobin, 2015). Emotions are either made known using a heuristic, writing experience, or cogen.
EAP has the following three underpinnings: transformative knowledge; bringing awareness; and identifying and investigating events revealing emotional experiences in teaching | learning as represented in Figure 5.1. Transformative knowledge brings in the exchange and communal nature of developing and, perhaps, changing ontology. Ontology is what a person identifies as true based on what is considered real for him or her. Emotions are very real responses, in the form of gestures and expressions to interactions. Collins (2004) proposed that the result of an interaction may change from negative to positive, for example, if a similar interaction occurs bearing a more positive result. Emotional experiences may or may not change depending on how strong the emotion is. Offering a safe space or medium in which to express the emotion is a way to cope and empowers the voice, allowing it to be acceptable to release the emotion as opposed to holding it in and looking past it. The emotional experiences that were revealed during identified events happened when the HR sped up or matched between multiple participants. The emotions experienced were not found to be traumatic but helpful to the participant while not focused on or spoken about. In the case
where two or more people wore an oximeter, ontologies were transformed through the sharing of experiences using a cogen. In some cases, two or more people felt connected or a bond was reflected, which Alexakos (2011) refers to as fictive kinship. When HRs showed intersections, or matching HRs, the investigation was about synchrony. Cogens allowed the understanding of the backstory for each person wearing the oximeter, which allowed insight to each person on why the emotional experience happened. At times, the emotional experience sounded similar based on his or her past lived experience. Emotional contagion is when emotions in an interaction becomes contagious causing the group that shared such a sense of solidarity to also bond (Tobin, 2009). Oximeters showed that there is some level of emotional contagion in teaching | learning.

Awareness brought through the hermeneutic experience of the narrative or cogen sheds light on how students or teachers feel while teaching | learning. Awareness takes center stage in EAP because a person may know that they may feel anxious, for example, but not acknowledge the anxiety in a noticeable, or visible, way. Awareness can guide teaching and empower the voiceless. Offering an academic safe space to discuss emotional experiences or to write about them in a journal allows for a deeper connection to be made. Without attempting to be deterministic, the primary goal of EAP with awareness is to highlight the emotional experience, as to
what happened and why it happened, in great detail. Including the narrative in research empowers the voice in a powerful way to deeply discuss the emotions in the moment and think back on the past lived occurrences that have led up to the current felt emotion. Even if nothing immediately changed, talking through or writing about what emotions have emerged in teaching | learning brings about awareness as opposed to looking over it.

Making the case for emotional experiences in classrooms investigates empowering the student or teacher in the emerging emotional event. Highlighting that there are emotional experiences in teaching | learning that impact our state of being reiterates that classrooms can be intentionally stressful places to encourage tackling challenges and shows how to emotionally navigate and cope with the emotion by choosing to accept it or let it go. Alexakos, in a research squad meeting in the Spring 2018 semester, talked about choosing to accept or let go of the emotion during meditative practices. It is important to highlight emotional experiences to inform our teaching | learning.

**Trajectory of Research of Emotions in Teaching | Learning**

Conversations that surround more acceptable emotions that occur school-wide are celebrated as a school via a school assembly such as on a last day of school celebration. This is in addition to the conversations that often surround difficult events and tragedies such as a school shooting, bullying, environmental threat, when
the school has lost a member of the school body to death or sickness, or other massive and potentially destructive event. For individual students, these conversations may be more private and had with the student and a counselor or trusted staff. Proactivity and reactivity are reflected from a top-down perspective and is often looked at as a class management concern. Over the years, mindfulness meditation has been used in schools to help with behavior concerns (Weare, 2013). I argue that mindfulness meditation was initially prompted as a reactive response as opposed to a proactive response.

When Mayer and Salovey defined emotional intelligence (1990) and applied it in schools since 1999, it was to help students be more knowledgeable, responsible, and caring and to make our youth better citizens in society and the workforce (Ciarrochi, Forgas, & Mayer, 2000). In an effort to become more emotionally adaptive in teaching | learning, EAP provides a framework to research emotional wellness and adaptivity in teaching | learning, thus bringing more curricular attention to emotional experiences within teaching | learning to engage the whole self within the interactions that occur at the micro-level. Better emotional health posits better self and sense of self. Emotions are a part of the learning environment, in moments of comfort and discomfort. If emotional wellness and awareness of emotional state improves health, and health is important and vital to our lives, then the
relationship between teaching | learning and emotional experiences is important to further research.

**History of Doing Research on Emotion in Education**

Gardner (1983) proposed intrapersonal intelligence as one of multiple intelligences derived from a strong self-awareness and regulation of feelings with the ability to guide the behavior of the other. Mayer and Salovey (2000) recognized Payne to be the first person to actually attempt to define emotional intelligence in his dissertation in 1985 as a type of intelligence that requires its own realm of facts, meanings, truths, relationships, and problem solving. Facts are the feelings, meanings are felt meanings, truths are emotional truths, relationships are intrapersonal relationships, and problem solving is our reaction to problems that are solved in a way that we feel as a reaction (Mayer, 2000). Mayer and Salovey (1990) defined emotion to be a type of intelligence because it involves having the capacity to observe, take part in, understand, and manage emotion (Mayer, 2000).

Goleman (1995) expanded on Gardner’s (1983) interpersonal intelligence, ability to understand and communicate with the other based on the social cues of the other, and intrapersonal intelligences to coin emotional intelligence as most important in the workplace where a leader can both interpret and manage the emotions of the self and other. Goleman (1995) wrote a book on
emotional intelligence, which made claims that resulted in changes in the educational policy in Rhode Island, thereby popularizing the concept (Mayer, 2000). Emotional intelligence was claimed to be the key to success in life and in the workplace. The claim that emotional intelligence was more important than a high intelligence quotient influenced schools to change their curriculum to surround improving the emotional intelligence of learners (Mayer, 2000). Emotional quotient (EQ) was used to investigate emotional intelligence and soon prompted the development of social and emotional learning (SEL) (Mayer, 2000).

Elias (1997) developed SEL as a way to produce learners that would be able to manage “life tasks” such as learning, forming relationships, problem solving, and transitioning well through life stages by adapting. SEL included skills such as self-awareness; impulse control; cooperativeness; and empathy (Elias, 1997). The agenda was to promote “goodness” by promising improvement in school and life, in interpersonal relationships, and in school and work climates achieved through learning, as emotion was part of the human personality (Mayer, 2000). When Mayer’s (1999) emotional intelligence was introduced to educators, the country was in emotional turmoil as it was very near the horrific emotionally draining experience of The Columbine High School shooting. Emotional intelligence impacted educators and school policy in a way that would address the needs of students.
needing dire emotional support. Recognizing that emotional support needed further research, meditation became a practice used to investigate emotional improvement.

Davidson worked at Harvard with Goleman in 1976, where they investigated *trait anxiety* and *attentional absorption* by monitoring the lengths in which the subjects meditated. Their work on altered traits stemmed from their work in using meditation as a tool for emotional improvement, which argued that ways of being can be improved with the daily use of a meditative practice (Davidson & Goleman, 2017). Davidson had also collaborated in research with Ekman (1990) to combine neuroscience with facial expressions, or behaviors, in investigating emotions. David and Ekman found that there was electric activity in the brain that was measurable and aligned with facial behaviors to emit emotions (Davidson et al, 1990).

Ekman (1992) described the following nine characteristics in identifying the six basic emotions: distinctive universal signals; presence in other primates; distinctive physiology; distinctive universal in antecedent events; coherence among emotional response; quick onset; brief duration; automatic appraisal; and unbidden occurrence. Distinctive universal signals are facial expressions, which are present in other primates that tie to Darwin’s three principles of emotions because Ekman was observing similarities in expressions between humans and animals.
Distinctive physiology is related to the patterns in the autonomic nervous system. Distinctive universal in antecedent events are emotions that have evolved from social learning experiences. Coherence among emotional response deals with observing some systematic relationship between the autonomic nervous system and the central nervous system during emotional events. Quick onset refers to the fact that emotions can happen even before the self is aware. Brief duration means that emotions typically last seconds. Automatic appraisal shows that emotions are caused by automatic or deliberate emotional stimuli. Unbidden occurrence means that emotions are not chosen by the self but happen to the self (Ekman, 1992).

Ekman’s (2006) work on facial expression and Davidson’s (2012) work on neurological responses to emotion took on aspects of Darwin’s three principles and built on them. Emotions, according to Ekman (1999), are needed for interpersonal relationships. Emotions, according to Davidson (2012), are an individual’s cognitive-behavioral response to lived experiences resulting in our unique emotional make-up. Davidson’s investigation of brain activity to study emotion dates back to 1984. Davidson’s (2012) Emotional Style (ES) described the following six categories, tracing back to brain signature, for how we think, feel, and react to our emotions: resilience; outlook; social intuition; self-awareness; sensitivity to context; and attention. Resilience is a
response time to life’s hardships; outlook is the timespan of one’s optimism; social intuition refers to the understanding of social cues during interactions; self-awareness deals with the understanding of the physical sensations in the body; sensitivity to context is the regulation of the emotional response; and attention is clarity and keenness of focus surrounding the experienced emotion (Davidson, 2012). Through narratives and cogenerative dialogues (cogen) of events, Davidson’s (2012) ES comes through where one potentially becomes the focus of the research depending on how the participant emotionally responds to the event. Building on the theories and understanding of emotions of Darwin, Elias, Goleman, Davidson, and Ekman, emotions are gestures, facial expressions, and physiological responses that are a result of interactions with the self’s inner voice or the other. EAP aims to bring awareness to how the participant responds and how others in the event respond back in reaction to the emotions in the moment.

**Understanding the Self and Other in Research**

Classrooms are filled with a variety of interactions such as teacher-oriented instruction, student-led instruction, and collaborative or cooperative learning. Collins’ IR Theory could be used to analyze the event using oximeters. Collins used IRC to understand, investigate, and explain human communication. The following are the four basic properties to IRC: the individuals
feel a sense of agency with one another; there is this emotional energy that an interaction is filled with; there is a generative quality to the interaction rituals which creates collective symbols; and disruptions to these symbols are considered harmful to the interaction ritual and collective society (Collins, 2004). With Collins’ IRC properties, interactions are understood to require to be between the self and the other; however, they are not exclusively between each other. Collins points out that there are interactions that we have with our own thoughts.

Bakhtin (1994) saw it as “self” associating with a group where this valued a person who is held as an evaluator and leader upon whom we base how we would communicate. Inner speech and outward speech come from what Bakhtin (1994) called “behavior ideology” where both are reactions to the environment and social group a person subscribes to. Inner speech was found to not be easily analyzed since it is inward unless it was based on an evaluated emotional correspondence or spoken outwardly as a result of a social interaction. As part of language and consciousness, inner speech is part of our existence and not to be viewed as a language with words itself but as utterances that our social groups that we assign to provide the words for when spoken aloud (Bakhtin, 1994).

While Collins (2004) argued that interactions require the self and other, inner speech, as Bakhtin stated, depended on the role of the other. Collins explained the role of thought in
interaction as one’s perceived image of self and not in the form of dialoguing with “self” as the other (Collins, 2004). Based on my first investigation of Petra who thought about her concerns in communicating her presentation to her classmates with her co-presenters, I argue that Petra challenged herself before she presented to her classmates because she knew how she wanted to be received and understood by her peers. Therefore, inner speech is considered as an interaction also in EAP and is analyzable using narratives and cogens. When researching using oximeters, video cameras are also used to record the class sessions. While oximeters are used to find statistically significant events, and events identified as salient contradictions, they also help in referring back to the recordings to be used as vignettes to share in a cogen.

**Investigating emotions in Teaching and Learning**

In the Spring Semester of 2012, Tobin and Alexakos began a research in Alexakos’ science teacher education course (2015) to investigate emotional wellness with the use of clickers, video recorders, audio recorders, oximeters, heuristics, and a squad of student researchers. The immense amount of materials brought into the classroom could investigate the three readings of the heart (HR, PLETHY, and SPO₂) that can lead back to the physiological expressions of emotions at the micro-level, emotional climate, emotional energy, prosody, proxemics, and facial expression recognition to read emotions that occurs at the micro-level.
Bellocchi (2013) defined the evolution of John Whitall’s social emotional climate (1949) as having been expanded from the emotional feelings expressed in an exchange between teachers and students to Evan’s emotional climate (2009), which is defined as a teacher’s ability to manage the complex interactions that arise in a class (Bellocchi et al., 2013). Emotional Energy is a product of social interactions which is stronger when there is more solidarity between the persons (Collins, 2004). Prosody is the analysis of the vocal expression of emotion (Dael et al., 2012). Proxemics is the space that occurs during communication (Tobin, 2009). Ekman’s research (2006) on facial expression of emotion can also be incorporated in the investigation of emotional wellness in teaching | learning. Cogens would bring in the backstory of the experience and express the feelings that occurred during the event or experience of teaching | learning as detailed on a heuristic, which would also be recorded on video.

**Self-Reporting Methods.**

In Australia, Tobin’s colleagues were continuing to research emotional wellness in science classrooms. Ritchie, along with Peter Hudson, Bellocchi, Senka Henderson, King, and Tobin, published research about questioning the validity and reliability of self-reporting methods used in emotion research (2016). In their research, the argument was made that emotion diaries and cogens were reliable and valid especially if used along with prosodic
analysis of the moment-to-moment experience of the events as they occurred (Ritchie et al., 2016). Bellocchi, along with Kathy Mills and Ritchie (2016), investigated online teaching | learning with preservice teachers in discussions where they described their emotions using blogging and emotion diaries in reaction to their face-to-face lessons. A take-away from this multi-theoretically framed research was that these preservice science teachers felt less afraid of teaching science, and social bonds were forged in a type of learning environment where students oft feel disconnected with online learning (Bellocchi et al., 2016).

Autoethnography.

I have incorporated autoethnography as part of my framework as I was both a participant and researcher in another class with Alexakos in 2014 where we both wore oximeters. During that time, we were interested in synchrony and found that there was an experience in the class that I did not expect to have where the topic of discussion in that moment brought on an emotional experience for me that was not very obvious to the naked eye but revealed itself in my heartrate and in some of my gestures. Pride (2018), a peer and research squad colleague, also incorporated autoethnography and Authenticity Criteria as adapted by Tobin in her work. Katelin Corbett (2018), a peer and research squad colleague, also used heuristics and autoethnography in her work as she, too, was a teacher | researcher in her science classroom with
both pre-service and in-service teachers. In my own research, I observed interactions that brought out emotional experiences revealed later by the heartrate using Collins’ (2004) IRC theory. In other research, Ekman’s (2006) work on facial expressions is needed to move forward with analyzing the data from video recordings.

**Multilogicality.**

These are examples of the body of work on emotional wellness and emotional state in teaching | learning that were investigated using multilogicality, which refers to the use of multiple methods and multiple theories. Multilogicality was needed to provide the multiple truths and the multiple voices as they were expressed through the experience of the research. Identities are challenged and developed, or transformed, as the research progresses. Research on emotional wellness in teaching | learning is not deterministic by any means and does not stand alone, but it adds all the voices that have risen simultaneously as the research continues. With bricolage breaking down to being critical, multi-level, multilogical research, each of us that has participated in researching emotional wellness in teaching | learning are bricoleurs interested in the three tenets of EAP, which are transformative knowledge, bringing awareness, and making cases for emotional experiences as they arise in teaching | learning.
The Three Tenets of Emotional Adaptive Pedagogy Framework

In investigating emotional wellness in teaching | learning, the intention is to understand how those emotions arose and why they occurred. It is necessary to discuss this as we, as teachers, believe that we are providing academic “safe” spaces for our students. Addressing the emotions is not to say that neither we nor our students have emotional experiences in the classroom that may add or take away from teaching | learning. EAP does not only apply only to classroom instruction; it can apply to any learning experience with the self or can get exchanged with the other where the overarching question problematizes the relationship between teaching | learning and the transformative journey of hermeneutically detailing the emotional experience. The three keystones of EAP are transformative knowledge, which is the journey of detailing what happened and why it happened and choosing what emotions to keep or let go of, bringing awareness, where the emotional experience is reflected on as attention is called to it, and the salient events are highlighted as contradictions where a change occurred that disturbed an otherwise constant or consistent flow of emotional energy.

EAP allows different combinations of methods to support the participant researcher and their voice. The most important part of this research is highlighting the event. An event in EAP can be highlighted in one of the following three ways: using statistical
means, SPSS; using cluster analysis; or picking a heuristic characteristic. By using statistical means, the observed data is tested and run to highlight all of the significant intervals. Since the intervals occur within a timespan, the significant intervals can be investigated further by checking the audio or video to match those data entry points, which will add more insight to what happened. After detailing what happened during the timespan, everything that can be visibly seen or audibly heard is noted down and discussed with the participant in a cogen. As a researcher, there is also the option of using a cluster analysis to investigate the participant’s emotional energy or emotional climate with the rest of the class. Using cluster analysis allows for investigating emotional contagion on a macro-level. With the use of heuristics, or using mindfulness-based tools heuristically, the characteristic chosen could be discussed individually, in a small group based on responses, or as a class. These methods allow an even closer look at the experienced emotions that were stimulated and allow narratives to explain why the emotional experiences occur where transformative knowledge, awareness, and significant events revealing emotional experiences are brought about.

**Transformative Knowledge**

The knowledge exchanged during a social interaction is social learning. Social learning develops one’s understanding through interactions, which brings about lived emotional experiences. This
emotional experience that occurs as a result of an interaction is what Collin has outlined as IRC (2004). Tobin argued that Lincoln and Guba’s Authenticity Criteria (1989) allowed bringing the participant’s voice into research to highlight the lived experience as one’s own truth (Tobin, 2012; Alexakos, 2015). Ontology being the nature of being is the lived experience that makes the person’s experience his or her truth. The experience of EAP is transformative in the experience of researching in the first place.

Transformative knowledge reveals itself in addressing what happened and why it may have happened with a focus on how the participant felt about it then and even now as the explication of the narrative occurs. For the participant, it expresses why a person may have felt the way they did and acknowledge if they should accept it, let it go, or develop it somehow. The acknowledgement of their emotions from their experience is not forced; it comes through talking through the lived experience. The ontology of the participant is expressed during the explanation of what happened, why it happened, and if it was found to be valid and reasonable, or acceptable. After the emotional experience is hermeneutically described, the participant expresses whether or not the emotion was expected to begin with and how to cope with similar circumstances where the emotion was experienced moving forward. That process is transformative because it offers a chance
for the participant to address an emotion that otherwise may not have been discussed. It is only because the moment was captured due to research. Cogens highlight this type of exchange where the participant can talk through their lived experience.

Experiences that arise in the classroom can be very relatable as we all have had emotional experiences in the classroom. As a researcher, the experienced emotions and the circumstances that stimulated them prompt reflection of how the researcher may have felt under similar circumstances. Of course, it is up to the researcher to decide how to include their own voice and detail their lived experience, but it comes out in how the research is theorized.

**Awareness**

Emotional Intelligence made the case for making only the students more knowledgeable, responsible, and caring. A whole implementation guide was offered to teachers and administrators to ensure that emotional intelligence was being supported properly in schools. That was when it was decided to also make sure that teachers were also emotionally stable to be able to emotionally support the students. The requirement to make sure teachers are emotionally stable within itself is flawed when schools do not guarantee an emotionally stable work environment. With research showing teacher burnout, bullying in and out of schools, and school
violence continuing to rise, more research investigating teacher’s emotional wellness in teaching | learning is needed.

Awareness is a key factor in emotional wellness in teaching | learning. Awareness is bringing attention in the moment to the emotions being experienced by self and others during social interactions. Once awareness is achieved, the emotional energy brought into or experienced during social interactions empowers the self to choose to either accept those experienced emotions or let them go. Awareness comes through the use of mindfulness-based practices such as meditation, and writing, and mindfulness-based tools such as oximeters, heuristics, and emotion diaries.

Awareness in teaching | learning allows for the acknowledgement of emotions as they are experienced in the moment or reflected upon later. There are surprise moments which arise during cogens that are brought about when an experienced emotion is recalled that may have been overlooked or forgotten by the participant. Both circumstances of experiencing emotions are equally important because the feelings are either repressed in some way or hidden. Should repressed or hidden emotions be handled as they arise during teaching | learning? Are there opportunities or enough time to address repressed or hidden emotions as they arise in teaching | learning? I argue that if there is no time to address these emotions as they arise in teaching | learning, then we are both unable to teach | learn through our interactions.
Identifying and investigating events revealing emotional experiences in teaching | learning

As Tobin (2015) states, separating these voices from the data takes away from the experiences had in the first place. Our research has been strengthened by the insight of the lived experience. Knowing the experiences of students as they present, teachers as they lead instruction, students as they take classes online, students as they sit in the classroom, and researchers as we interact with the data, is equally valuable to the research we are presenting in this field. Thick and thin coherences highlight events in teaching | learning. A learning environment would have to be defined as learning does not only take place in the classroom. EAP opens learning environments to be both in and out of the traditional classroom setting. The voice of the participant is the foundation of this research.

The learning environment can be defined in terms of Sewell’s (2005) culture. Once the learning environment, or culture, is detailed, the data from the mindfulness-based tools will help in highlighting or revealing significant events using Tobin’s Event-Orient Inquiry (Tobin, 2012). Significant events are the thin and thick coherences that highlight a difference or a change. Significant events can be defined as an interesting moment or moments that may have changed the emotional environment in the classroom or can be defined as catalytic.
The Contribution of Researching Emotionally Adaptive Pedagogy

EAP aims to unite the body of work done on emotional wellness in teaching | learning. It is a way to allow multiple truths and include polyphonic and polysemic lenses to the research that continues to transform the ontologies of the participants involved even in the slightest way. Awareness and being present in thinking about the experienced emotions as they occur allows for better interpretation and coping with whether it is better to keep that feeling or let it go, which is similar to what is done in meditative practices. EAP is a theoretical framework that offers researchers a bricolage of theories and methods they can use as they interpret and develop their research to discover new understandings and empower their voice and those of the participants in the same chapter rather than keep each part separate because as with teaching | learning, those truths and those voices that emerged throughout the investigation coexist simultaneously.

EAP in teaching | learning promotes emotional wellness for all who participate at any level in the body of research. It prompts thinking in the moment about feeling, reflecting on why it happened, and thinking about how it feels now that awareness is present. By comparing and reflecting on past emotional experiences under similar circumstances, coping with emotional experiences for the next similar circumstance can continue to be addressed in productive ways. It is empowering not only in that the research
has given the authority to attach a voice to the experience in as
great detail as possible, but it is empowering also because it is
up to the person who has gone through the emotional experience. If
the person experiencing the feeling is not the researcher, the
researcher is reflective throughout the entire process because the
researcher writes what he or she has discovered. Before doing the
research, the researcher had one position to utilize to go on the
emotional journey throughout the investigation and observation.
With meticulousness and such care, the voice of the participant is
respected and retained as much as possible, and we may add our own
voice to the body of research, because it is also an event as it
is occurring and ever changing.

Merging the research on emotions and research on teaching |
learning problematizes the emotional support and adaptivity of
emotional experiences in learning environments. Earlier in the
chapter, I mentioned teacher burnout. There is no research that
investigates how teaching | learning is impacted by emotional
experiences of teachers and learners in that type of learning
environment. EAP offers a theory of education that emotionally
supports teaching | learning of both teachers and learners as
social learning is navigated. In each of my investigations using
mindfulness-based tools, specifically the finger pulse oximeter,
salient events were found by observing contradictions as with Petra
and myself or testing them using statistical analysis when
investigating Matt, Leah, and Christian, awareness was brought through the experience of watching the video recordings—both with and without the participant, and knowledge was transformed by way of cogens.

EAP includes the overarching question of navigating complex emotions that arise in emotional experiences in teaching | learning. EAP does not promise to solve and eradicate specific emotions; instead, EAP details the journey of unpacking the emotions experienced and the choice of whether or not to continue experiencing that emotion whenever similar circumstances arise in the future in teaching | learning. While my research in EAP focused on Alexakos’ thorny issues (2011) and building on Collin’s Interaction Ritual Chains (2004), interaction between self and inner self, the complex emotions did not include those of participants with emotional disorders. Research can extend to involve the emotional journey of teachers in teaching | learning as well in and outside of the traditional classroom setting. Research can extend to school counselors who support students in teaching | learning. EAP can be used to research on any learning environment in or beyond the classroom setting where knowledge is shared socially, and emotions are experienced and expressed.
6. My Journey as a Researcher of Emotions in Teaching | Learning

Teachers bring ideals, values, and expectations into their teaching. However, teachers are not always thinking about their own emotional impact, emotional state or emotional response when doing so or that of their students. Teachers already have quite the task in creating a class that empowers critical thinkers. Unintentionally, teachers and learners may be passing up the opportunity for their students to explore their own emotional state and emotional response as they emerge or arise in a learning environment. While researching emotional experiences in teaching and learning, there was a shift in how much more reflective I became on how I presented myself, my values and my expectations, to others-- whether intentionally or not. As a researcher, the emotions I investigated made me question what my emotional response as a teacher was in a specific situation, how the emotional response I experienced was similar or different from the participant’s experience (where it applied), and the causes that made my emotional response change or remain the same.

Researching Heuristically with Finger-Pulse Oximeters

We are not always aware of our emotional states and physiological responses. Finger pulse oximeters can be used to both bring about such awareness as well as investigate relationships between heart rate and emotional experiences in
teaching and learning. Wearing a finger pulse oximeter informs the wearer immediately of their heartrate, blood oxygenation, and strength of the heartbeat.

My interest in finger-pulse oximeters began after wearing one while sitting in class as a student, while teaching, and while at home either relaxing or cleaning. After routinely observing my heartrate, I was able to notice fluctuations in my heartbeat when I was angry, sad, happy, or fearful, and the curiosity around emotions in teaching and learning grew.

While heartrate is measurable, I learned that I also wanted to incorporate the experience of the participants. Observing heartrates to identify events allowed for focused discussions on a particular timespan in the learning environment, where the participants, myself as well as others, explained what they were going through emotionally along with the causes. The self-reporting methods, such as my autoethnographic account of my emotional state and response when race was mentioned, served as a way of acknowledging the impact of the emotional response a participant goes through. There are innumerable amounts of emotional experiences in the classroom. I found, through my research, that emotional responses that otherwise would go unnoticed can be made visible and highlighted by the use of the finger-pulse oximeters. Such events offer entries into conversations that can promote depth in teaching and learning.
I connected my own personal experience with my research studies as the two of them were related to public speaking, more specifically—presenting to classmates. Thinking about academic “safe” space now, I can see that I should have felt more confident about presenting in front of people I know and trust. However, teacher education does not usually cover the emotional experience of presenting to your own classmates or the ups and downs for waiting on your turn to present. We are told that a person should feel better presenting in front of their class because of the familiarity with classmates. Yet, it could easily feel discomforting. Not only did I find that I was uncomfortable presenting ideas and my perspective to my classmates, I was uncomfortable to even listen to ideas expressed in the classroom. I wanted to just speak on the topic planned and move on.

**Inner Voice & Solidarity**

Before waiting to speak to others, there is a dialogue that happens between self and the inner voice that brings on an influx of emotions. The influx of emotion that comes seconds before speaking can bring about anxiety. In my second chapter, Petra had asked herself seven questions to help her recheck how she would deliver her presentation, which caused her anxiety. I argued in my research with Petra, that Collin’s Interaction Ritual Chains (IRC) in his Interaction Ritual Theory (2004) should expand to include inner voice. Inner Voice can be an objective other that the self uses to
think through intentional conversations before they occur or within seconds of being said aloud to a physical other.

IRCs require a sense of solidarity in order for an emotional exchange to occur within the interaction. In Petra’s case, in Chapter 2, she felt solidarity with her co-presenters and wanted to make sure her portion of the presentation went well and engaged the class in discussion as that was their goal for their presentation. That unifying goal prompted Petra to think through her presentation again right before speaking to make sure she exhibited clarity in expressing what was on her presentation slides and cover what might have still been missing, just in case.

In Matt, Leah, and Christian’s case, in Chapter 3, the relationship was stronger between their own identities and relationship with the topic of race. That relationship was reflected in the heartrate synchronicity between Leah and Christian, how Leah related to what Christian expressed and Matt’s concerns of feeling like he could be a part of the conversation. Noticing how Matt’s heartrate deviated brought about conversation regarding where the disconnect happened for him, which he explained as connectedness and relatability to the topic. The cogens allowed for a sense of being and feeling heard in a topic where each co-presenter could truly express how each felt about both leading a conversation on race and its impact such a conversation had on the self and their perception was received by their classmates. Matt,
Leah, and Christian became closer after both planning the co-presentation and reflecting during the cogen as they now had insight on how each of them had felt discussing race and sharing some of their own racial experiences.

I also investigated myself as a student researcher in a doctoral class. Discussions in classrooms and academic research spaces do not often include teachers and learners speaking about the potential difficulties of discussing topics, such as race or dislike subjects that can cause discomfort for any number of reasons. Conducting research on emotional state and emotional response highlighted that more opportunities could be made to discuss emotional experiences as they emerge to create an academic “safe” space where students can better thrive in social learning. I have learned through researching myself was that I can better conduct what I consider to be uncomfortable topics in the classroom. As a teacher, leading the conversation or adding my voice to a topic that students bring up that I did not necessarily plan on discussing, taking the time to think about what I am trying to say as I am saying it not only allowed me to find myself, my thoughts, and my words better than before. Before, I would rush past the topic rushing to get out a response so that I could move on, but now taking my time to find my thoughts and put them into words, I found that students were more engaged and appreciated the
How My Research Has Transformed Me

Petra’s emotional experience was revealed using a finger pulse oximeter through the hermeneutic experience of detailing what happened at that moment and why it caused anxiety for her. Petra became aware of how she sounded to her peers by hearing her recorded voice, became aware that she did not hear her classmate, Laura, speaking, and became aware of HR response to her emotional experience of anxiety. Before I present or share my thoughts in a space where I feel anxious, I try to practice reciting my thoughts aloud and even take moments to say my thoughts to myself before speaking. It doesn’t always work, but I am aware that I am attempting to improve on speaking publicly.

When investigating Matt, Leah, and Christian’s emotional experience of two parts of their presentation, while each of the three co-presenters wore finger pulse oximeters, transformative knowledge that occurred for me was related to how each co-presenter felt when hearing the story of Pudd’nhead Wilson in the first event and their views of usage of the N-word in the second event. In addition to talking about what happened for each of the presenters, the co-presenters were looking at their heart rates as the recording
showed images of each of their heartrates. Matt, Leah, and Christian, who also co-authored the chapter with Arnau Amat and me, were able to fully express and detail, as participants and researchers, the synchronicity of their HRs as well. Awareness for the three co-presenters emerged during the cogen as participants talked about their racial identity and positionality on race as they identified themselves and how others identified them. Matt, for example, spoke about appearance and how a person may or may not look like the race with which they identify, which pulled him away from parts of the presentation and paralleled with what was revealed in his HR readings (Amat et al., 2016). Using the same methods used in my investigation of Petra, statistical analysis was used to highlight and observe salient events. In addition to highlighting the salient events, Pearson’s Correlations were run to further investigate heartrate synchronicity and Alexakos’ fictive kinship (2011). This brought more awareness to Matt, Leah, and Christian about how emotional solidarity can bring about fictive kinship and emotional contagion during a discussion on race (Amat et al., 2016).

By using autoethnography to investigate my experience as a student and researcher in Alexakos’ class at The CUNY Graduate Center in Fall of 2014, there was a personal growth for me that came in the research process of this investigation. Writing about race and the value and need for my voice on matters of race
empowered and encouraged me to question how I wanted to engage and participate in that conversation with others. That experience was transformative for me as I reflected on what happened during those four particular minutes and why I experienced anxiety both in my HR readings and gestures. Becoming aware of how I reacted during conversations of race, or where the word “race” is mentioned as an additional component of the conversation versus the main topic, challenged me to think about how I defined this experience. I had to choose if race was important to me to find a better way to cope with discussing race and coping with being able to participate in the conversation when and how I wanted to. This current semester, I teach pre-service and in-service teachers how to teach elementary mathematics to grades 1 through 6, and while thinking about inquiry, students brought up social justice and mathematics. This particular experience stood out to me as the best experience of such a conversation because I was mindfully present throughout purposely and purposefully taking my time through my thoughts to express how to think about intentionality, positionality, and impact of thoughts, ideals, values, and beliefs when and while teaching | learning.

**Emotionally Adaptive Pedagogy**

I was able to cope in a way I felt most comfortable through writing through how I felt addressing or even being a part of conversations about race, which would not have happened if I had not come across
the heartrate readings. The shock I felt inspired me to get to the bottom of why I was so uncomfortable listening to the conversation. I started to pay attention to my breathing, my gestures, and my heartrate and I wanted to stop being uncomfortable. The autoethnographic account helped me better handle having the conversation about race and made me think about and consider other topics where I am uncomfortable too.

This is what I hope Emotionally Adaptive Pedagogy as a theoretical framework adds to research, a part of me has grown and evolved to and at the root of that growth are my emotions. I can have better conversations about race because I feel better about how I want to discuss it when I want to say something and I am prepared to be a better listener on the matter.

Emotionally Adaptive Pedagogy in learning environments are more than a debriefing session, consisting of in-depth reflections on discomforting moments in the classroom. For example, I am strong in knowing who I am and my background but did not take into account how I participate in the conversations as a speaker and listener. As a teacher, I am now aware of how I participate in conversations that my students may be uncomfortable with. I allow students multiple opportunities to disclose in the class, or to me privately, what has made them uncomfortable so it can be discussed understanding that it may not be that simple. Many times, we overlook emotions labeling them as “not a big deal”. For example,
my discomfort in conversations with race was not a big deal and even though it was mentioned and not the focus of the course, I just had to get through that moment quickly. Now, there is no sense of wanting to rush through a conversation of race.

My research has made me think about other instances where students may feel like just getting through a topic quickly and how to allow students to reflect deeply about how to participate while experiencing discomfort. Self-reporting methods have helped me because I questioned why I had experienced those emotions as I detailed what happened, which is a hermeneutic process, and even knowing what emotion to reflect on was not easy. Using a mindfulness based tool and video recordings of the class helped me to focus on a small timeframe. I used a finger pulse oximeter, but other mindfulness based tools and practices can be used. Once a salient event is selected, either by finding contradictions (which are differences or inconsistencies) or synchronicities (similarities), use a self-reporting method that would allow you to think deeply about what it is that happened and why. My research has begun to highlight responses to conversations, lessons, topics, and experiences that have aroused influxes of emotions, and emotionally adaptive pedagogy as a theoretical framework is a call to bringing and maintaining awareness of our emotional responses in learning environments as we teach and learn.
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