

Gender-based emotional regulation and cardiac-interoception: A correlational study on the sixth sense

By Anvi Palav

Author Biography

Anvi Palav is a high school senior passionate about neuroscience, cognitive science, and healthcare innovation. She researches cardiology and interoception, aiming to improve diagnostics and treatment. Anvi intends to major in neuroscience or biotechnology in college next year. As the founder of BioMedizone, she empowers students to develop biomedical solutions. Anvi has conducted research at Rutgers University to explore AI applications in cancer genomics. Dedicated to bridging science with real-world impact, she strives to advance healthcare accessibility and innovation through research, leadership, and service.

Abstract

The present study explored the correlation between adolescent emotional regulation and cardiac-interoceptive accuracy. This study consisted of 30 high school students aged 14 to 18 who were given two questionnaires. The Introductory Questionnaire (IQ) assessed background and demographic information to contextualize the study's later findings. The Emotional Regulation Questionnaire (ERQ) was adopted from (Gross & John, 2003) to assess participant emotional health in two facets with a Likert scale: expressive suppression and cognitive reappraisal. The heartbeat detection task measured the residual value, which calculated the distance away from the actual value the participant's prediction was in a mathematical model: $R=|A-P|$, where R represents the residual value, A represents the actual value, and P represents the predicted value. The results of the study showed that 89% of men had a higher expressive suppression score than women, likely due to gender stereotypes. There was a positive relationship between the average expressive score and residual value, which indicates that the more adolescents suppress their emotions, the less self-aware they are of their heart rate. Females had an average residual value of 13.11 whereas males had an average residual value of 26.33, indicating that the female group was able to more accurately predict their heart rate. Given the widespread impact of poor self-awareness, more studies should be done to determine whether this phenomenon is fueled more by societal gender stereotypes, school rigor and environment, and the influence of race.

Keywords: cardiac-interoception, residual value, adolescents, emotional regulation, expressive suppression, cognitive reappraisal, gender stereotypes

Introduction

The mind, body, and heart are interconnected under multiple layers of cells, tissue and muscle. However, the extent of interconnection in the body is not just a measure of life and health, but also an indication of self-consciousness (Schulz et al., 2016). In recent years, society is facing a decrease in self-consciousness levels (Millière et al., 2018). Lower self-consciousness presents society with two major problems: a worsening mental health crisis and delayed disease detection.

The United States is facing one of the biggest crises in its history: the adolescent mental health crisis. According to Rossen and Cowen, approximately 20% of high school students will experience a mental health illness, and even more will be affected by it in some way (Rossen & Cowen, 2015). Approximately half of the 20% of high school students that experience a mental health illness will not receive the help they need (Rossen & Cowen, 2015). As the United States inches deeper into the mental health crisis, the need for increased self-consciousness and emotional regulation becomes increasingly vital.

Self-consciousness proves vital for early disease detection as well. On average, women report more intense and frequent bodily symptoms for a given disease than men do (Barsky et al., 2001). According to Suneja et al. (2022), the issue of late disease detection has become more and more prevalent in the recent century; diagnostic delays are linked to a greater risk of disease progression and contagiousness. Suneja et al. (2022) also found that people who are able to recognize more symptoms are more likely to be diagnosed earlier. Tying this back to Barsky et al. (2001)'s findings on women reporting more bodily symptoms than men, it can be deduced that the common factor here is the difference in how self-aware women are of their bodies than men are.

In light of these two growing issues with the emotional state of adolescents in the United States worsening and the rate of delayed diagnostics increasing, this study will explore a correlation between the ability of an individual to sense their internal bodily processes and the impact of gender

stereotypes in society on their emotional regulation abilities.

Literature review

Emotional management

Taute et al. (2011) describes the concept of emotional management and utilization, which is fueled by the way an individual identifies and works with their emotions. Emotional regulation tends to be gendered, where women are more likely to manage their expressions of anger by remembering positive feelings such as happiness; on the other hand, men are more likely to transform negative emotions such as depression or fear by drawing on more negative experiences such as anger (Lively, 2008).

Self-consciousness

Millière et al. (2018) defines self-consciousness as bodily awareness, self-experience, and self-thoughts. Self-consciousness on a larger scale is a major bodily process that influences much of the world of neuroscience and psychology. In order to discover a correlation between self-consciousness and interoceptive accuracy, Aspell et al. (2013) tested whether or not bodily perception correlates with interoceptive and exteroceptive signs or signals from distinct systems. The study found that those with synchronous cardio-visual signals had higher rates of self-identification and self-location toward the virtual body. This lends to the idea that those who are more aware of their interoceptive and exteroceptive capabilities had higher rates of self-identification and self-consciousness.

Interoception and mental health

Khalsa et al. (2017) defines interoception as the ability of the nervous system to sense signals originating from the body on both conscious and unconscious levels, monitoring internal bodily processes. They also state that a dysfunction in interoception is an important symptom of numerous mental health conditions: anxiety disorders, mood disorders, eating disorders, addictive disorders, and somatic symptom disorders. Khalsa et al. (2017)

defines interoceptive accuracy as the concision and precision of the body's neural network to sense internal bodily processes. In addition to these assertions, a study led by Schulz et al. (2016) discussed the correlation between cardiac-interoceptive accuracy, the ability of an individual to accurately determine their own heart rate, and patients diagnosed with depression. The researchers of this study concluded those with more depressive symptoms had more interoceptive accuracy. Furthermore, they concluded that an increase in interoceptive accuracy also results in an increase in self-consciousness because of an increase in attention towards one's body and bodily processes.

Cardiac-interoception

Al et al. (2020) noted that timing along the cardiac cycle (systole vs. diastole) impacts the perception of visual or auditory stimuli, and that cardiac function correlates to conscious perception. Garfinkel et al. (2016) found that those with anxiety or increased levels of self-consciousness were found to have higher levels of cardiac-interoception. Hence, cardiac-interoception influences many cognitive processes such as pain, visual perceptions of fear-inducing stimuli, and memory (Garfinkel et al., (2016).

Adolescents and emotions

According to Romeo (2013), adolescence is marked by significant changes in hypothalamic-pituitary-adrenal (HPA) axis reactivity, resulting in increased stress-induced hormonal responses. Romeo (2013) also states that stress-induced hormonal responses typically mature much later than the rest of the human body, typically 50-60 years after birth.

In addition to these findings, Chung & Robins (2015) asserted that self-conscious emotions typically develop later in life towards the adolescent stage of an individual's life. This occurs because adolescents undergo dramatic changes physiologically and psychologically, making it a prime age group to study (Hu et al., 2021). They claim that adolescent studies are different from adult studies due to adolescents' emotional sensitivity,

instability, and poor self-control. Lambie and Lindberg (2016) measured emotional regulation among children, and they found that gender roles in children had an impact on self-consciousness. Furthermore, Timmers et al. (2003) conducted a study that found that women are more inclined to pay attention to their own and others' feelings and intuition than men are, backed up by (Lausen & Schacht, 2018), who classify women as "emotional experts."

The gap

Much of the existing literature provides valuable insights on emotional recognition, maturity, self-consciousness, and interoception and how all these variables are interconnected with relationships with each other. However, little research covers the difference in how the impact of traditional gender stereotypes on emotional regulation correlates with cardiac-interoceptive accuracy. There is a notable gap in research specifically exploring the interconnectedness of gender roles, interoception, and emotional regulation, which lends the question: To what extent does conforming to gender-based emotional regulation stereotypes impact cardiac-interoceptive accuracy in adolescents?

Methods

This correlational study included aspects of experimental methodology in order to inquire on a correlation between cardiac-interoceptive accuracy and gender-based emotional regulation. This study was conducted in three parts: the introductory questionnaire, the emotional regulation questionnaire and the heartbeat detection task. These three parts contribute to the answering of the research question: To what extent does conforming to gender-based emotional regulation stereotypes impact cardiac-interoceptive accuracy in adolescents?

Recruitment and description of participants

In order to maximize the recruitment process, participants were informed of the study through distribution of a cover letter. Participants completed consent forms with both Student Assent and Parent Assent prior to participation in the study. After participants completed the consent forms, they were provided with a two-week period to allow them to back out as this study is completely voluntary. This study was conducted with 30 total participants with 21 being female and 9 being male. Participants throughout all grade levels in high school participated: 4 were freshman, 9 were sophomores, 12 were juniors and 5 were seniors. This study also had participants of differing races: 5 were Hispanic, 12 were Caucasian, and 13 were Asian.

Introductory questionnaire

At first, participants were given an Introductory Questionnaire (See Appendix A) to provide contextual information about their backgrounds. This was employed because multiple variables affect emotional regulation, such as culture and age, as suggested by Chung and Robins (2015). The Introductory Questionnaire was structured in such a way that it measured how much an individual conformed to gender roles as well in terms of their management of emotions, which is proven to have an impact on emotional regulation as stated by Lively (2008). The Introductory Questionnaire contained a mix of multiple-choice, multiple-select, and open ended questions. Similar to the Introductory Questionnaire, a baseline questionnaire was also used by Schulz et al. (2016) in order to create a baseline and then track changes throughout the study. This approach allows for the collection of nominal data from background information that could sufficiently make valid conclusions about the ability of the individual to regulate their emotions.

Emotional regulation questionnaire

After participants completed the Introductory Questionnaire, they then completed the Emotional Regulation Questionnaire (ERQ) (See Appendix B) synthesized by Gross and John (2003),

which utilized a Likert Scale with 10 questions. The Likert Scale was numbered on a scale from 1-7: 1 was strongly disagree, 4 was neutral, and 7 was strongly agree. This approach allowed me to collect ordinal data because the scale groups the numerical ranking values into distinct categories. Gross and John (2003) meant for this scale to measure emotional regulation in two ways: cognitive reappraisal and expressive suppression. The questions also alternated between questions assessing cognitive reappraisal facet, which leans towards the tendency to alter one's emotional perspective, and the expressive suppression facet, which leans towards the tendency to suppress emotions (Gross & John, 2003). This questionnaire was credible and viable to use because of its extended use in the field of study for decades.

Heartbeat detection task

After the participants completed the ERQ, they moved onto the heartbeat detection task aspect of the study. In order to successfully complete the heartbeat detection task and determine cardiac-interoceptive accuracy, participants attached a pulse oximeter to their finger in order to detect their actual heart rate. They were then asked to predict their heart rate without looking at the pulse oximeter or taking their pulse themselves through their radial artery in the wrist and carotid artery in the neck. Schulz et al. (2016) utilized this method in order to determine the correlation between cardiac-interoception and depressive behaviors; therefore, this method proves viable for the research question explored in this study. Cardiac-interoceptive accuracy was determined by the Residual Formula:

Figure 1: The residual formula is used for finding the relative cardiac-interoceptive accuracy.

$$R = |A - P|$$

In this equation, the value R represents the residual, or difference, between the actual heart rate A and the predicted heart rate P. This equation finds how close the predicted value is from the actual value, so R will always be a positive value. Residual values and relative cardiac-interoceptive accuracy have an inverse relationship.

Ethical considerations

This study was also conducted under ethical practices through multiple measures. Throughout the recruitment phase, nondiscriminatory practices will be used by opening this opportunity for all to participate in. By doing so, grade level also becomes a variable to take into consideration as according to Hu et al. (2021), emotional regulation capabilities in an adolescent tend to change throughout their development.

There was no potential for physical, mental, or psychological harm within this study for the participants or the researchers. The participants were fully acknowledged about the study prior to the study being conducted. This study and its methodology has also been reviewed and approved by the Institutional Review Board (IRB), ensuring that any risks were dealt with appropriately and reinforcing the fact that the methodology complies with ethical research practices.

Furthermore, to mitigate privacy concerns, instead of having participants share names in order to keep all questionnaires and data organized, each participant was assigned a number and asked to report their number directly onto all questionnaires. All data was collected on paper copies of the questionnaires; these records are stored in a locked file-cabinet and after three years, they will be destroyed.

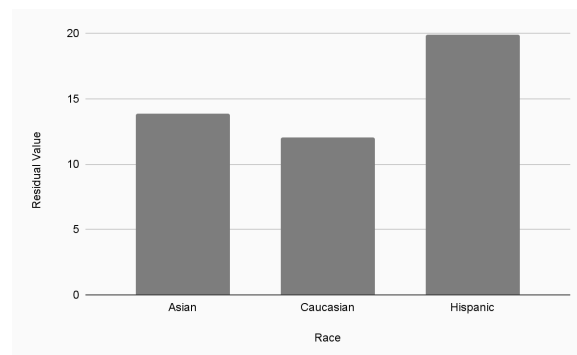
Results

With the proposed methodology and a sample size of 30 adolescents, the data analysis took approximately two months to complete. The introductory questionnaire contained 13 questions, 11 of which were multiple choice and two of which were open ended questions because they asked about either how culture affects their personal emotional state and to make a prediction based on their emotional regulation level. Because the answer will vary due to each individual's experiences, those two questions were best suited to be open ended.

On average, 89% of participants noted that they had encountered gender stereotypes at some point in their life. The remaining 11% who noted that they had not encountered any gender stereotypes had a relatively lower average residual value at 15.

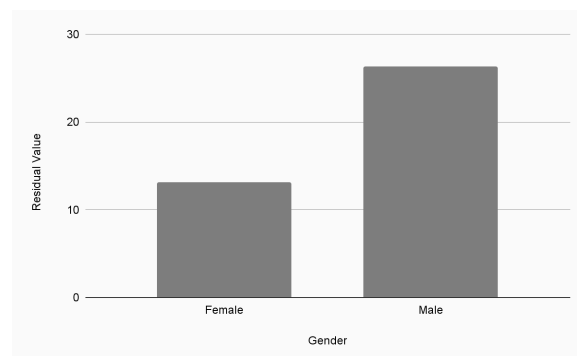
The Introductory Questionnaire evaluated the race, gender, emotional management method, and exposure to traditional gender stereotypes. In an analysis of race among participants, there were 3 racial groups: Caucasian, Asian, and Hispanic.

Figure 2: Race vs. residual value



Utilizing the information provided by the Introductory Questionnaire and the Heartbeat Detection Task, a correlation between race and residual value was determined. In Figure 2, the three races are compared to the residual value: caucasian participants had a mean residual value of 12.07, Hispanic participants had a mean residual value of 19.9, and Asian participants had a mean residual value of 13.84.

Figure 3: Gender vs. residual value



Utilizing the information provided by each participant in the Introductory Questionnaire and the

Heartbeat Detection Task, there was a distinct difference between gender and residual value. In Figure 3, females had a mean residual value of 13.11 whereas males had a mean residual value of 26.33, almost double that of their female counterparts. On average, males had a higher residual value than females.

The ERQ consisted of two types of questions, both measured on a Likert scale numbered 1-7, with 1 being strongly disagree and 7 being strongly agree. The questions evaluated both the level of expressive suppression and cognitive reappraisal that the individual utilizes in their emotional regulation method.

Figure 4: Expressive suppression v. gender

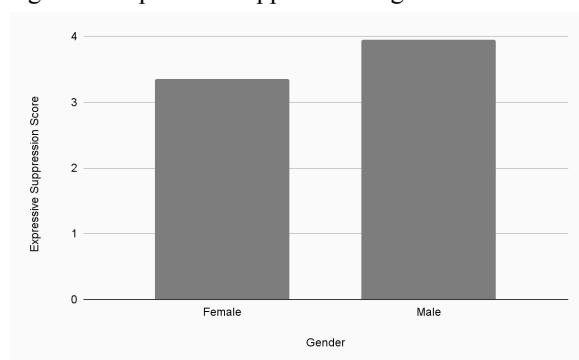
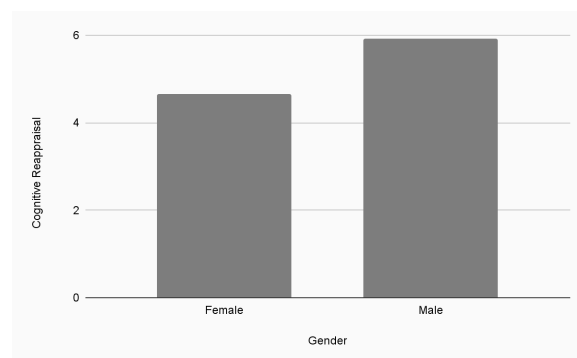


Figure 4 illustrates the average male expressive suppression value on the Likert scale from 1-7 (See Appendix B) which is 3.95 whereas the average female expressive suppression value on the same scale is 3.36.

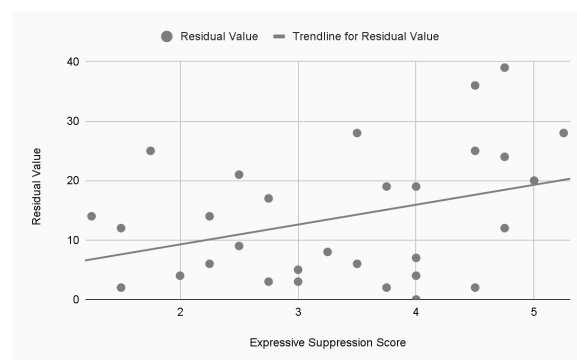
If there was a difference between expressive suppression levels based on gender, logically, there should be a difference between cognitive reappraisal methods based on gender. A similar relationship between both variables was found.

Figure 5: Cognitive reappraisal v. gender



According to Figure 5, the average male cognitive reappraisal value on the ERQ's Likert scale was 5.92, whereas the average female cognitive reappraisal value was 4.658.

Figure 6: Expressive suppression v. residual value



In Figure 6, there is a slight positive relationship between the expressive suppression score of each participant from the ERQ's Likert scale and residual value from the heartbeat detection task. Building up to answering the research question, the participants were then asked to identify any situations where they were negatively affected and exposed to gender stereotypes.

Figure 7: Number of people exposed to each common emotional gender stereotype

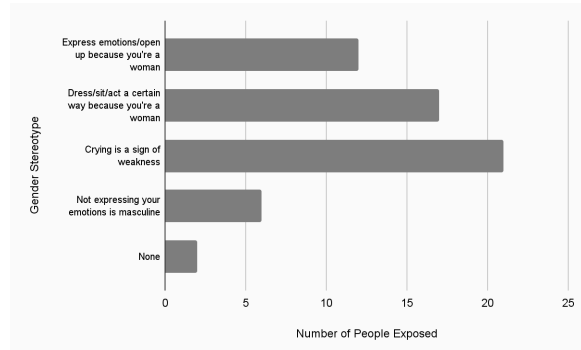


Figure 7 suggests that 12 adolescents resonate with the stereotype that crying is a sign of weakness, 17 adolescents resonate with expressing emotions and opening up because it's feminine, 21 adolescents resonate with having to dress or act a certain way because it's feminine, and 6 adolescents resonate with suppressing emotions because it is masculine. Of the 6 adolescent males that participated in this study, all of them resonated with suppressing their emotions because it is masculine. Of the 30 participants in this study, only two of them have never been exposed to traditional gender stereotypes.

Discussion

Gender stereotypes have been proven to be correlated to emotional regulation, where those influenced by gender stereotypes tend to be more self-conscious about their emotional state (Lively, 2008). Hence, someone who is able to regulate their emotions better should be more self-conscious about themselves. Because of this, the original hypothesis of this study was that those who are able to regulate their emotions better would better sense their own heart rate and have better cardiac-interoceptive accuracy. This hypothesis was proven correct by the data in this study.

On average, Hispanic adolescents had a higher residual value than Asian adolescents and Caucasian adolescents as indicated by Figure 2. With deeper analysis, when asked whether or not culture plays a role in how the student regulates their emotion in Question 3 of the Introductory Questionnaire (See Appendix A), Hispanics tended to feel pressure with acceptance and racism from being

in a marginalized society. This suggests that Hispanics tend to have a harder time regulating their emotions and therefore they had a higher residual value. Caucasian adolescents had the smallest residual value and Asians had the second smallest. This could be explained because of Western influence: an increased exposure to Western culture leads to increased self-consciousness (Chung & Robins, 2015). Because Caucasians have the most exposure to Western culture, they are more self-conscious and therefore have a lower residual value since they would be more accurate in predicting their heart rate. On the other hand, both Asians and Hispanics have less exposure to Western culture, which would explain why their average residual values are higher. Hispanics are more likely to have a higher residual value than Asians because they have been historically more marginalized than Asians have been in Western society and are more prone to racism, one of the biggest influences in the way Hispanics regulate their emotions, as they pointed to in the Introductory Questionnaire.

On average, adolescent males had a much higher residual value than adolescent females as indicated by Figure 3, indicating a lack of self-consciousness among adolescent males (Lively, 2008) and therefore a relative inability to regulate emotions well. This can be explained by Tottenham et al. (2011)'s study, where the scientists found that females are better at distinguishing their emotions than males, regardless of their age group (Tottenham et al., 2011). Because females have a better ability to regulate their emotions than males, men must be more impacted by traditional gender stereotypes than women because traditional gender stereotypes impact emotional regulation for everyone, regardless of the gender (Lively, 2008).

The notion that men struggle to regulate their emotions more than women is also supported by Figure 4, in which adolescent males had a higher expressive suppression score than females did, which suggests an inability for men to properly regulate their emotions. On a similar note, when looking at Figure 5, the average cognitive reappraisal score for men is higher than that of their female counterparts, indicating that instead of dealing with emotions by confronting them, males tend to avoid them. Women

are more likely to manage their expressions for anger by remembering positive feelings while men manage it by remembering negative feelings (Lively, 2008). This conclusion then connects back to the fact that men tend to suppress their emotions more, a direct result of them being unable to resolve their negative emotions into positive emotions the way that females tend to do.

Looking at Figure 6, there is an apparent correlation between expressive suppression scores and residual values. Evidently, the more likely an individual is to suppress their emotions, the less likely they are to be accurate with predicting their heart rate. Men are less inclined to pay attention to their own emotions due to their lack of self-awareness, and hence, they are unable to predict their heart rate accurately.

Figure 7 inquired about each individual's exposure to certain traditional stereotypical situations regarding gender. In Question 3 of the Introductory Questionnaire (See Appendix A), five Asian participants noted that their culture made them feel stressed academically. With this mindset, and a competitive high school environment, most students are bound to feel that crying is a sign of weakness.

Figure 7 also shows that all of the male participants noted that not expressing their emotions is masculine. This ties into Figure 4, where men were more inclined to suppress their emotions than women.

Gender-based emotional regulation stereotypes impact the ability of an individual to regulate their emotions. For example, the stereotype that men should suppress their emotions because it is masculine, which all male participants in this study resonated with, led to a higher average expressive suppression score among male participants as opposed to female participants. A higher expressive suppression score means a higher residual value (See Figure 6), which means men are less self-conscious and are more likely to be inaccurate with their heart rate predictions. Because the gender stereotype for women is that they should express themselves more or dress and act a certain way because it's feminine (See Figure 9), they are naturally more self-conscious than males (Timmers et al., 2003). This means that

the average expressive suppression scores for females will be lower than that of the males, and hence, their residual value will be lower, indicating an accurate prediction of their heart rate.

Limitations

Though the original hypothesis of this study has been upheld, there were several limitations that may have impacted the degree to which the hypothesis can be applied to answer the research question. To start, many participants noted a feeling of anxiety or nervousness as the pulse oximeter was applied to their fingers, which could impact the accuracy of their heart rate predictions. Future research can mitigate this by putting the pulse oximeter on the participant's finger before they complete the questionnaires and leaving it on their hand while they complete it. This way, the participant's mind is shifted from the fact that there is a medical device attached to their finger to the information in the questionnaire. After the questionnaires are completed, the participants can be asked to predict their heart rate without looking at the pulse oximeter, and the results can then be compared to the value on the pulse oximeter at the moment. This would result in more accurate scores and the individuals to better be able to predict their heart rate.

Furthermore, the small sample size of 30 participants limits the ability to generalize these conclusions beyond high school. However, the link between poorer gender-based emotional regulation and more inaccurate cardiac-interoception supports the need for additional larger-scale studies to further establish this link, especially given the importance of improving mental health in schools and earlier disease detection for patients. Future studies should explore a possible correlation between gender-based emotional regulation and cardiac-interoception in other schools, potentially less rigorous schools, to identify if the pattern might correlate with the rigor of the school. By identifying this, communities can work towards improving the emotional regulation methods of adolescents.

Conclusion

Evidently, much can be said about the correlations between gender-based emotional regulation and cardiac-interoception among adolescents. The findings in this study suggest that both men and women were relatively inaccurate in predicting their heart rate, and both genders were inclined to suppress their emotions. These facts make it crucial for school systems, communities, and families to encourage adolescents to become more self-conscious and suppress their emotions less. Adolescents should be encouraged to engage in stress-relieving emotional regulation methods such as listening to music, seeking nature, journaling, and more. The promotion of individualism in Western society will help adolescents focus on themselves in order to obtain mental and emotional clarity (Chung & Robins, 2015), but a lot has to be done to change the dynamic of high school environments, especially those as competitive. By making active efforts to uplift the emotional regulation levels of all adolescents, it is likely that society will see changes in the mental health of its adolescents and the time it takes to diagnose any disease. With the rising mental health crisis and an increasing amount of adolescents deprioritizing their health, change is a must and the key to reducing mental health illnesses and disease progression throughout the United States.

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Appendix A

Introductory Questionnaire

Thank you for taking part in this research study. Your participation will help contribute to the understanding of emotional expression and interoceptive accuracy. Please be sure to answer the questions completely and honestly. If you feel uncomfortable answering any of the questions below, please feel free to skip them.

Your Assigned Number: _____

Today's Date: _____

1. What gender do you identify as?
 - a. Male
 - b. Female
 - c. Non-binary
 - d. Prefer not to say
2. Please identify your race below.
 - a. American Indian or Alaska Native
 - b. Asian
 - c. Black or African American
 - d. Native Hawaiian or other Pacific Islander
 - e. White
 - f. Other Race
 - g. Prefer not to say

3. What role does your race play in how you express your emotions?

4. Which of the following emotion-management methods best resonates with you?
- a. Seeking nature: taking a walk outside, taking a scenic drive, etc.
 - b. Breathing exercises
 - c. Listening to music/creating music
 - d. Journalism/writing your thoughts down
 - e. Meditation
 - f. Do a hobby: drawing, biking, cooking, dancing, etc.
 - g. Exercise/workout
 - h. Talk to someone: a friend, a parent, a therapist, a counselor, etc.
 - i. None of the above
5. The way that you personally experience emotions is impacted by traditional gender stereotypes.
- a. Strongly Agree
 - b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly Disagree
6. Women are told to be more expressive and self-conscious of themselves.
- a. Strongly Agree
 - b. Agree

- c. Neutral
- d. Disagree
- e. Strongly Disagree

7. In your opinion, how comfortable are men in expressing their emotions to others?
- a. Very comfortable
 - b. Moderately comfortable
 - c. Not comfortable at all
8. Which of the following situations regarding traditional gender expectations for emotional expression have you been in/resonate with most? Choose up to two answers.
- a. Being told you should express your emotions/open up because you are a woman
 - b. Being told to dress/sit a certain way and be more self conscious of yourself because you are a woman
 - c. Being told that crying is a sign of weakness
 - d. Being told that not expressing your emotions is masculine
 - e. None of the above
9. You feel your heart rate elevating whenever you are excited.
- a. Strongly Agree
 - b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly Disagree
10. You feel your heart rate elevating whenever you are angry.
- a. Strongly Agree

- b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly Disagree
11. You feel your heart rate elevating whenever you are nervous.
- a. Strongly Agree
 - b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly Disagree
12. You feel your heart rate elevating whenever you are fearful.
- a. Strongly Agree
 - b. Agree
 - c. Neutral
 - d. Disagree
 - e. Strongly Disagree
13. How much do you think your ability to sense your heart rate will be impacted by how well you manage your emotions?

Appendix B

Your Assigned Number: _____

Emotion Regulation Questionnaire (ERQ)

The questions below involve two distinct aspects of your emotional life. One is your emotional

experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please use the following scale and record your response on the dashed line.

1 2 3 4 5 6 7

Strongly Disagree | Neutral | Strongly Agree

1. ____ When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
2. ____ I keep my emotions to myself.
3. ____ When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
4. ____ When I am feeling positive emotions, I am careful not to express them.
5. ____ When I am faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. ____ I control my emotions by not expressing them.
7. ____ When I want to feel more positive emotion, I change the way I'm thinking about the situation.
8. ____ I control my emotions by changing the way I think about the situation I'm in.
9. ____ When I am feeling negative emotions, I make sure not to express them.
10. ____ When I want to feel less negative emotion, I change the way I'm thinking about the situation.

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85, 348-362. <https://doi.org/10.1037/0022-3514.85.2.348>