

## **Psychological Barriers to Human Flourishing: Applying research on emotions to reduce prejudice.**

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Abstract: There is a well-established relationship between emotion and prejudice. However, humans are not passive emitters of emotion but can act upon and regulate their emotional states using a variety of strategies. Given the pervasiveness of anti-prejudice norms, an explanatory gap exists between how experiencing negative emotions toward out-groups leads to prejudicial attitudes. One explanation is that the development of prejudice is a consequence of individuals' failure to appropriately regulate their emotions within an ethnically diverse environment. Research on emotion regulation suggests that expressive suppression of affective responses to out-groups could be responsible. Expressive *suppression* as a regulatory strategy is associated with the development of several adverse psychological traits including increased anger and aggression, anhedonia, and insecurity. These traits are also independently associated with the expression of prejudicial attitudes towards out-groups, however, only minimal research has investigated the direct relationship between the two.

We propose to study the regulation of emotion as a psychological system influencing prejudice towards ethnic out-groups. Using a sample of affectively sensitive Canadians, *we test the following hypotheses:* 1) Individuals who experience strong negative emotions in response to out-group exposure and who suppress these emotions will be more likely to have prejudice towards these groups, 2) Training individuals with prejudice to *cognitively reappraise* instead of suppressing their emotions will reduce their negative emotions and consequent prejudicial attitudes. To test these hypotheses, we apply a series of psychophysiological measures which capture suppression and reappraisal during an affective (out-group) image task. We also administer an eight-week intervention during which participants are trained to cognitively reappraise their emotions. Working in collaboration with an NGO specializing in anti-prejudice, we plan to apply our research to develop better anti-discrimination policies and programs. This project will be pre-registered with OSF and submitted as a registered report with Nature and Human Behavior before data collection.

This is the first draft of the formal experimental protocol. We welcome all comments, feedback, questions, or cries of anguish. We are interested in feedback about the best possible measures of prejudice and discrimination as well as strategies for sample recruitment. Thank you for your patience with any spelling, grammar, or formatting issues.

Keywords: Discrimination, Emotion, Emotion Regulation, Suppression, Reappraisal, Experiment

## Introduction:

Prejudice is a significant barrier to human flourishing in democratic societies. Prejudicial attitudes and behaviours have negative social and economic consequences for the victims of discrimination, including erosion of core values like cooperation, trust, and equality, upon which democratic societies function. Individuals and groups who experience prejudice or discrimination in their daily lives have lower levels of personal efficacy, are significantly less likely to participate in public life, have poorer health outcomes, and have lower levels of educational attainment and career development (Flanagan et al., 2009; Schildkraut, 2005). Experiencing prejudice may also influence how individuals perceive public officials, elected representatives, and a government's performance (Knowles et al., 2010). By repressing individuals' personal development, discouraging public participation, and undermining the integrity of democratic institutions, prejudice damages the stability of social and economic development and diminishes interpersonal connections, key pillars of human flourishing.

Traditionally, social scientists study discrimination using theories of socialization and experience. While still important, social scientists using these approaches are struggling to explain recent increases in prejudicial attitudes in North America and Europe as well as the increases in support for nativist political parties (Lucassen & Lubber 2012; Mudde, 2013; Mutz, 2018). In a very recent example, these theories fail to explain the increase in anti-Asian attitudes, which has accompanied the on-going COVID-19 pandemic (Dhanani & Franz, 2020; Reny & Barreto, 2020).

Furthermore, meta-analyses of the socialization literature show evidence of weak reliability with the model's ability to reduce prejudice (Paluck & Green, 2009; Paluck et al. 2021). Studies testing the socialization model are underpowered, lack appropriate experimental controls, rely on convenience samples, or use a weak measure of prejudice.<sup>1</sup>

This lack of support is not surprising, at the core of the socialization model is the assumption that bringing people into closer social contact will increase empathy and share perspective-taking and result in a reduction of prejudice. Unfortunately, this assumption is not supported by neuroscientific research demonstrating that humans are unlikely to empathize with people with whom we do not share a close personal connection or experience. Furthermore, research on emotion and prejudice show that negative emotion towards an out-group is associated with avoidance of intergroup contact (Miller et al. 2004; Petersen, 2019) In other words, anti-prejudice programs relying on empathy via socialization may not be suitable as national policies as these programs are likely to show decreased efficacy when the scale of the program removes opportunities for sustained person-person or person-community contact (Mansell & Warren, 2022).

The relationship between emotion and prejudice is well established in the social sciences (Aarøe et al. 2017; Arceneaux, 2017; Harell et al. 2021; Kessler et al. 2010; Millar et al. 2004; Muradova & Arceneaux, 2021; Tenenbaum et al. 2018). We suggest a body of research in psychology may help us better understand prejudice by using theories of human cognition, particularly the variation in individual responsiveness to environmental factors like stress, threat, or negativity (Hibbing et al., 2014). A key finding of this literature is that individuals vary in affective sensitivity, their

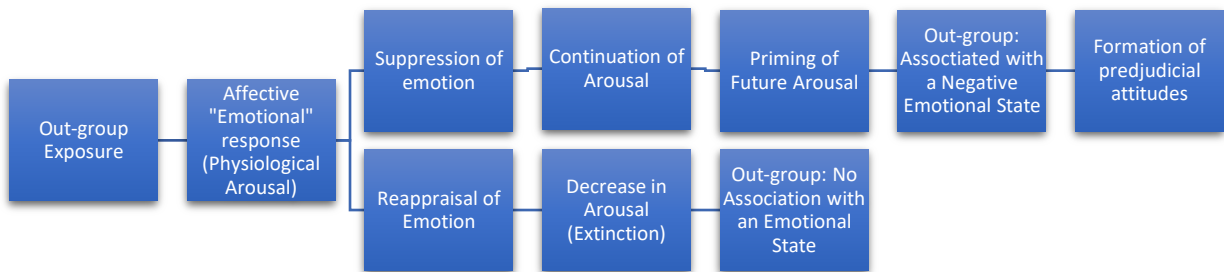
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<sup>1</sup> The socialization model shows a divergence on effect between attitudes and behaviors. The socialization model shows moderate successes in reducing discriminatory behavior but not on attitudes.

tendencies to perceive a threat, and the perception of threat is correlated with physiological arousal and the generation of negative emotions (Buck, 2014; Cacioppo et al., 2014; Canetti-Nisim, et al., 2009; Schere 2009). For example, a well-replicated body of research finds that individuals who are highly sensitive to disgust, the emotional experience of revulsion to an unpleasant taste, smell, touch, or visual cue, are much more likely to hold prejudicial attitudes toward ethnic out-groups and to strongly oppose the immigration and integration of other ethnicities into their country (Aarøe et al. 2017; Hodson and Costello, 2007; Tybur et al., 2016). Other studies on emotions and prejudice find similar associations with the sensitivity to startle response, fear response, disease avoidance, and negative images (Amodio et al. 2003; Choma et al. 2012; Navarrete and Fessler, 2006; Oxley et al. 2008). This relationship between emotion and prejudice suggests that prejudicial expression may depend on a complex interaction between the variations in individual emotion and cognition e.g., how individuals perceive, value, and act on information in their environment (PVA). To our knowledge, this connection between individual cognition, environmental cues, and emotional regulation has not been used to inform approaches to prejudice reduction or antiracism programming.

Focusing on prejudice towards ethnic out-groups, this project integrates the study of attitude formation from the social sciences with the study of emotion in psychology by asking the question: *How do differences in emotional experience and emotional regulation affect the development of prejudicial attitudes?* Conceptually displayed in Figure 1, the project has two research objectives: 1) to investigate whether the expressive suppression of negative emotions (anger, disgust, fear, resentment) contributes to prejudicial attitudes towards racial groups; and 2) to investigate whether teaching individuals to cognitively reappraise their negative feelings and manage their emotions in a positive constructive way will have a lasting effect on their perceptual biases and discriminatory attitudes.

Fig 1: Emotion Regulation Model of Prejudice



The project uses an experimental design with a sample of participants who differ in their prejudicial attitudes towards an ethnic outgroup. Explicit attitudes are indexed using extensive self-report measures. Implicit attitudes are captured through a racialized implicit association test

and a visual processing task involving ethnic out-group faces. We will measure physiological arousal through skin conductance response (SCR). The suppression of emotions will be measured using a combination of skin conductance response (SCR), heart-rate variability (electrocardiography, interbeat interval), finger pulse amplitude (blood pressure). The reappraisal of emotions will be measured using single electrode electroencephalogram (EEG) of the left-PFC measuring late positive potential (Parvaz et al., 2012). We also plan to apply eye tracking to capture gaze aversion which past studies associate with stimulus avoidance an alternative strategy for emotional regulation (Oschner & Gross, 2014).

We also will ask participants about experiences with stressful life events, which may impact their emotion regulation. These methods capture implicit and explicit prejudice and allow us to separate individuals who experience negative emotional arousal in response to ethnic out-groups but may or may not hold prejudices. Once separated, we examine whether it is the suppression of emotion which best explains prejudice.

### **Brief Note on Discrimination vs. Prejudice:**

In this project, we adopt the perspective that there are many causes of prejudice towards others. A commonly cited definition of prejudice in political science, social psychology, and sociology is Allport's 1954 definition that "prejudice is an antipathy based on faulty and inflexible generalization" (Allport 1954). This definition is an inadequate description of out-group antipathy causally linked to affective sensitivity. While many societies deem prejudices as inappropriate or immoral the problem is that prejudices linked to affective sensitivity are not based on "faulty" information but result from real emotional experiences. In our view, the importance of emotion as a determinant of prejudice is understudied. Furthermore, we believe the existing literature on emotion and discrimination inadequately accounts for the complexity of emotional processes in its causal explanations. Consequently, we defined prejudice "as antipathy based on faulty and inflexible generalization or the misapplication of emotional appraisals in a given social context". Note: this definition would benefit from some revision. Concern, people challenging the contextual nature of the definition.

## Emotions Theory:

Preceding section on appraisal theory is highly specialized. Please feel free to jump to the next section entitled Regulation of Emotion.

Appraisal Theory: This project relies on the *appraisal* theory of emotions, which is part of the multi-componential processing family of emotional theories.<sup>2</sup> Appraisal theory was proposed by Arnold (Arnold 1960) and developed Lazarus (Lazarus 1966) to explain how different emotions may emerge from the same event, in different individuals and on different occasions (Moors et al. 2013). Appraisal theories of emotion hold that it is the way a person interprets (valuates) a situation—not the situation itself—that gives rise to one emotion rather than another emotion (Siemer et al. 2007). According to Moors, “appraisal processes and the information that they use thus form the main causal determinants of the various components that together form the multi-componential response patterns called emotions” (Moors et al. 2013 p. 123). In other words, the appraisals and other components mediate the significance of events an individual. Furthermore, appraisal theory accounts for the union of cognition and emotion that results when information is viewed in the light of individual motivations.<sup>3</sup>

Multi-componential theories of emotion such as appraisal theory view an emotional episode as involving changes in several organismic subsystems or components. Subsystems include: 1) an appraisal component with evaluations of the environment and the person-environment interaction, 2) a motivational component with action tendencies or other forms of action readiness for example approach or avoidance motivations, 3) a somatic component with peripheral physiological responses (an involuntary response which can be measured in real-time), 4) a somatic (voluntary) component with expressive and instrumental behaviour for example facial expressions, 5) a feeling component with subjective experience or feelings e.g. emotions.

Finally, appraisal theory and other multi-componential models understand the generation of emotions to be a continuous and recursive process. In any environment individuals engage in a continuous process of perception, valuation, and action (PVA). This sequence involves the perception of information from their external environment, the judgement of the costs and benefits of the perceived information for their well-being and interests<sup>4</sup>, and behavioural updating in response to the cost-benefit analysis. Within this model, changes in any one component such as perceived costs to personal interest, feedback into other five components (outlined above). For example, changes in one’s appraisal of personal costs can lead to changes in physiological arousal

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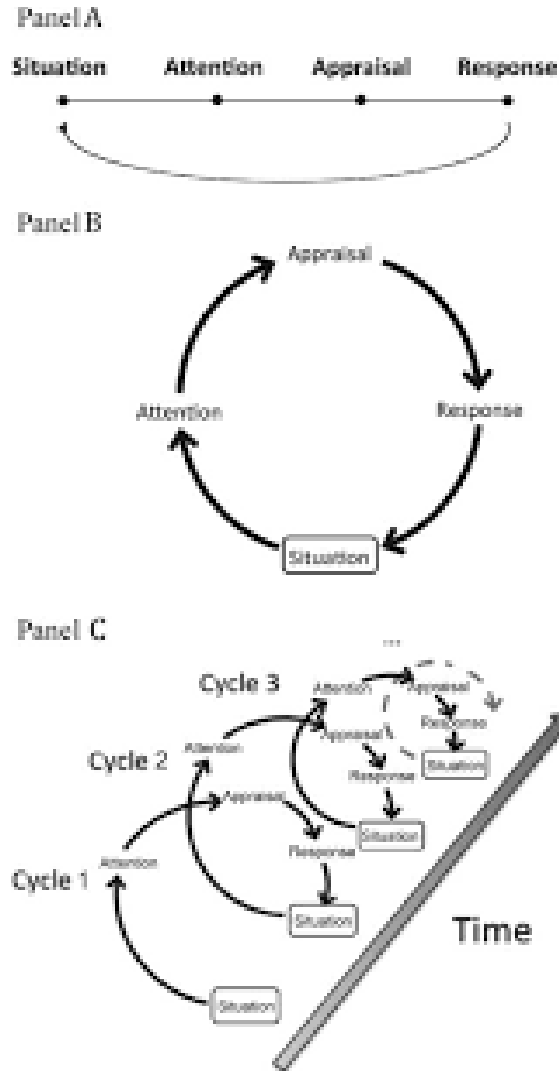
<sup>2</sup> Multiple theories of emotions use the term appraisal. Major differences between appraisal theory and other are: 1) definition of appraisal, 2) the role of appraisal in emotion and predictions about the relation between changes in appraisal and changes in other components, 3) predictions about individuals, cultural, and developmental differences (Moors et al. 2013).

<sup>3</sup> Core of appraisal theories is that emotions are adaptive responses which reflect appraisals of environmental features that are significant for the organism’s fitness (Moor et al. 2013).

<sup>4</sup> Well-being is conceptualized as the satisfaction or obstruction of concerns Frijdga 1986, 2007). Concerns include an individual’s needs, attachments, values, current goals, and beliefs; they include everything that an individual cares about (Frankfurt 1988)

and behavioural responses such as a motivation to withdraw from a given situation. In turn, these may lead to changes in the appraisal, for example, your perception of an environment as threatening. Importantly, in any given environmental experience, individuals employ multiple parallel PVA sequences. The processes in each of the components do not need to be completed before they can produce changes in later components e.g., the outcome of one PVA sequence can interrupt the operation of another at any time.

Fig 1: Model of a Perception, Valuation, and Action Sequence in Appraisal Theory



Note: Original source not available. Image to be removed from published draft. Replace with image from Oxford Handbook on Emotion Regulation.

## Regulation of Emotion: Expressive Suppression and Cognitive Reappraisal

Humans are not merely passive emitters of emotion but can actively affect their emotional experience (Mauss et al. 2007; Westerlund et al. 2021 p. 5095). *Emotion regulation is defined as* “the manipulation in self or other of (a) emotion antecedents or (b) one or more of the physiological, subjective, or behavioural components of the emotional response” (Gross & Levenson, 1993 p. 970). In simplest terms, emotion regulation refers to the different ways individuals manage strong emotions including anger, excitement, frustration, and happiness. Individuals can and do, employ a variety of different regulatory strategies including avoidance or distraction to affect their emotions. Several studies have considered how the “up” or “down” regulation of emotions may relate to social and political attitudes. However, these studies have focused on individual differences in discrete emotions like empathy or the effectiveness of emotion-inducing interventions (Arceneaux, 2017; Batson 1998; Eisenberg, 2000; Feldman et al. 2020; Harell et al. 2021; Muradova & Arceneaux, 2021; Sirin et al. 2017; Tenenbaum et al. 2018). To our knowledge, political scientists have not widely considered how individuals’ differences in regulatory strategy relate to differences in social attitudes (for an exception see Lee et al. 2013).

Critically, psychiatric studies show that reliance on certain “maladaptive” regulatory strategies are associated with increased risks of developing different psychopathologies including anhedonia and depression (Aldo & Nolen-Hoeksema, 2012, Aldo et al. 2010). One regulation strategy commonly associated with unwanted or negative emotions and adverse psychological effects is expressive suppression, which is the “inhibition of one’s own emotion expressive behavior while emotionally aroused” (Gross & Levenson, 1993 p. 970). The use of expressive suppression is associated with the prolonged duration of negative emotions (Gross & John 2003; Nezlek & Kuppens 2008) which is known to negatively affect later appraisals (Bodenhausen, Musseiler, Gabriel & Moreno 2001; Lerner & Kelner 2000).<sup>5</sup> With repeated use, the expressive suppression of negative emotions decreases the experience of positive emotion, increases the experience of negative emotions, and primes the nervous system to experience stronger responses to subsequent negative emotional events (Demaree et al. 2006; Goldin et al. 2008; Webb, Miles, & Sheeran 2012; Harris, 2001). In other words, individuals who habitually expressive suppress their emotions tend to experience stronger adverse psychological responses over time. Furthermore, expressive suppression is also independently associated with reactive sensitivity and social aggression (Demaree et al. 2006; Goldin et al. 2008; Scott et al. 2015; Webb, Miles, & Sheeran 2012; Harris, 2001; Tull et al. 2007). Recent studies also link the self-reported expressive suppression of emotion with prejudicial attitudes and behaviours towards out-groups (Mansell & Warren, 2021; Westerlund et al. 2021). Finally, recent research suggests an association between social interactions involving ethnically diverse social groups and expressive suppression (Naumann & Ramirez, 2021).

We theorize that among individuals with strong affective responses towards out-group members the expressive suppression of negative emotions leads to the development of prejudicial

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<sup>5</sup> It is closely related to experiential avoidance (Kashdan, Barrios, Forsyth, and Stegar 2006; Su, Wei and Tsai 2014), the unwillingness to experience unpleasant emotions, thoughts, bodily sensations and behavioural dispositions (Hayes et al. 1996). Part of a larger psychological construct of inflexibility, a predictor of generalized prejudice (Levin et al. 2016). Also, individuals may lack the ability to cope with automatic prejudiced reactions; psychologically inflexible individuals may be more likely to act on these beliefs (Levin et al. 2016).

attitudes. According to our model, the repeated expressive suppression of affective responses towards out-groups increases the intensity and duration of negative emotional experiences which over time creates an association between out-group members and negative emotions. Eventually, the association between out-groups and negative emotions is consciously rationalized in the form of negative attitudes (Gazzaniga 2012).<sup>6</sup>

Cognitive Reappraisal: An important alternative regulatory strategy to emotional suppression is cognitive reappraisal. Cognitive reappraisal involves reassessing a situation, changing its meaning, and thereby modifying its emotional impact (Gross, 1998). Cognitive reappraisal is commonly used in cognitive behavioral therapy for the treatment of psychiatric disorders. Research shows that reappraisal effectively reduces negative emotions and increase positive emotions (Gross and John 2003; Nezlek and Kuppens 2008) and reduces the risks of developing psychopathologies (Aldao et al. 2010).

Several studies find an association between the application of emotion reappraisal and a reduction in prejudicial attitudes. For example, Halperin and Gross (2011), find that cognitive reappraisal is associated with positive attitudes towards out-groups. In an Israelis sample, humanitarian aid for Palestinians was positively correlated with self-reported cognitive reappraisal. In a separate study, Halperin et al. (2014) find a negative correlation between self-report cognitive reappraisal and political intolerance in Israeli citizens during the 2009 Gaza war. Similarly, prompting an Israeli student sample to use cognitive reappraisal while reading a news article which prompted intolerance, decreased both negative emotions and intolerance as compared to the control condition (Halperin et al. 2014). In a separate lab study, the effect of cognitive reappraisal on tolerance towards Palestinians was still observed during a 5-month follow-up assessment (also see Alkoby et al. 2017).

We are theorizing that teaching individuals high on affective sensitivity to cognitively reappraise their emotions will result in a reduction in discriminatory attitudes towards ethnic out-groups. Consistent with our hypothesis, both Mansell & Warren (2021) and Westerlund et al (2021) find that self-reported cognitively reappraise is associated with reduced prejudices or increased acceptance of out-groups. Additionally, Lee et al. (2013) finds that that cognitive reappraisal was negatively associated with support for a 32-item measure of conservative policies.<sup>7</sup>

Two important limitations with the current theory are that a limited body of research has tested the effects of cognitive reappraisal on prejudicial attitudes. Second, most of this research was conducted in the context of the Israel-Palestine conflict. A particular concern with the second limitation is whether the effect of reappraise on attitudes will generalize to other forms of discrimination. In other words, do the cultural, geographic, and historical factors make the prejudicial attitudes in Israel-Palestine conflict psychologically distinct from other prejudices?

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<sup>6</sup> We also theorize that negative behaviours emerge because of an avoidance response that accompanies the association between out-groups and negative emotions.

<sup>7</sup> An additional concern, Aldao and Nolen-Hoeksema 2012 found that the cognitive reappraisal and other adaptive emotion regulation strategies had a negative association with psychopathology only when the level of maladaptive strategies was high.



## Research Methods

**Research Question:** Are prejudicial attitudes towards outgroups correlated with the expressive suppression of emotions?

### **Project Outline:**

1. Subject Pool Development and Sample Recruitment (Online).
2. Participant Recruitment and Completion of Demographic Survey Items (Online).
3. Physiological, Implicit, and Behavioural Assessment (In-person).
4. 8-week Intervention (Online).
5. Physiological, Implicit, and Behavioral Re-assessment (In-person).
6. 6-month attitude follow-up (Online).

**Theory: The Emotion Regulation Model of Prejudice.** Higher levels of expressive suppression in response to out-group members will predict greater levels of prejudicial attitudes.

### **Hypotheses:**

- 1) Individuals who experience strong negative emotions in response to out-group exposure and who *expressively suppress* these emotions will be more likely to have prejudice towards these groups
- 2) Training individuals with prejudice to *cognitively reappraise* instead of suppressing their emotions will reduce their negative emotions and consequent prejudicial attitudes.

**Power Calculation:** Estimated sample size is calculated in G.Power 3.1 using a Repeated Measure ANOVA, within-between interaction (F-test). Noteworthy, an accurate power calculation is challenging given the large number of items of interest. As a conservative estimate I conducted an a Repeated Measures, between factors tests power calculation with a 15% effect size,  $\alpha = 0.05$ ,  $1 - \beta = 0.95$ , groups = 2, measurements = 20, correlations among repeated measures 0.5, and a non sphericity correction = 1 (e.g., correction not required for 2 groups). This results in a total estimated sample of  $n=252$ . Next, I estimate the number of participants required for the experimental intervention using a Repeated Measures, within-between interaction with a 10% effect size,  $\alpha = 0.05$ ,  $1 - \beta = 0.95$ , groups = 2, measurements = 20, correlations among repeated measures 0.4, and a non sphericity correction = 1 (e.g., correction not required for 2 groups) the total estimated sample size for the intervention is  $n=92$ . This indicates that if approximately half of the ( $n=252$ ) participants were assigned to the intervention ( $n=126$ ) sufficient statistical power will be available to identify the meaningful effects.<sup>8</sup>

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<sup>8</sup> Noteworthy is that the estimate effects sizes 15% and 10% and correlations among repeated measures are somewhat arbitrary. These coefficients are based on studies from previous research on prejudice, but they do not involve a similar experimental protocol. I am currently seeking more suitable models for comparison to generate a more reliable estimate.

However, because we are interested in several 3-ways interactions (whose power is difficult to calculate), anticipate a high level of sample attrition, and heterogeneity in response to treatment, our strategy is obtaining the largest sample possible (n=400). A post-hoc power analysis will be conducted after the completion of the study to ensure we have sufficient power.

**Sample Details:** We recruit a sample of participants from the community of London and Middlesex County using a multi-wave sampling design.

Stage 1. Subject Pool Development: Approximately n=10,000 residents of London & Middlesex County will be sent an advertisement via Canada Post inviting them to join the subject pool for the *Emotion and Society Lab*. A follow up message will be sent one week after the initial advertisement.

In the advertisement, participants are informed that by joining the *Emotion and Society Lab* subject pool they will be contacted by the lab about opportunities to participate in future research. These research opportunities will be both online and in-person at local centres in their community. They are also informed that participation in any study is entirely voluntary and that participants may withdraw from any future studies at anytime without penalty.

The ad will feature Western's logo and direct participants to our registration website. Participants who visit our webpage will be informed that they will be compensated \$5 CAD for registering for the subject pool.<sup>9</sup> Registration takes approximately 7 mins and requires individuals to disclose their emails, postal address, and complete basic demographics and attitudinal questions such as: age, sex, ethnicity, education, ideology, a short Big 5 personality measure, a two item measure of negative emotions towards out-groups, a measure of out-group Like-Dislike, and several emotional distractor questions. Prior to registration, participants who visit the webpage will be informed that we are seeking participants for an upcoming study and that compensation in this future study can be as much as \$200 for approximately 3 hours of participation. Based on funding consideration, the total number of registrants will be capped at a maximum of n=3,000.

Due to their geographic proximity, invitations will be initially distributed to two community clusters: 1) Byron, Lambeth, and Westmount, 2) Oakridge, Huntington and Hyde Park. We begin by targeting these communities for two reasons; 1) the communities have high levels of demographic diversity (social, economic, ethnic); and 2) they contain community centers suitable for the in-person data collection. Invitation rollout will be staggered so one community within each cluster will be targeted at a time. Staggering invitations is necessary to simplify in-lab data collections. Project advertisements will be sent to additional communities if required.

Stage 2. Participant Recruitment: From the list of registrants obtain in Stage 1, we will invite 400 participants to participate in our full study. To ensure enough participants are available who experience out-group antipathy the participant registry will be divided based on their responses to the question assessing negative emotions towards out-groups obtained in Stage 1. Participants will then be randomly selected from the high (n=240) and low (n=160) negative emotions groups, a 60-40 split. Oversampling from the high negative emotions groups is based on concerns that the

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<sup>9</sup> A payment of \$5 is chosen because it can be mailed to participants via Canada post. The University ethnic board will not allow us to advertise monetary compensation in the initial study advertisement sent via Canada post.

attrition rates could be higher in this group. An oversample of high negative emotions is important for obtaining a sufficient sample for the experimental intervention. We anticipate a 15-20% attrition rate during the experimental intervention (final samples of n =192, n=128). Expected time required to collect data from 400 respondents is eight weeks.<sup>10</sup> To avoid confounding with the experimental exercise, the exclusion criteria for our study are participants who ethnically identify as of Black, African American, Canadian American, or Caribbean decent. A secondary exclusion criterion related to our ethnic appraisal task is applied to participants who do not identify as other than White, Asian, South Asian, or Latinx. Secondary exclusion criteria reflect the need and availability of pre-rated images of a person's ethnic in-group as part of a appraisal task completed during the in-person assessment.

**Pre-Lab Attitudinal Scales & Measures:** CV = convergent validity; DSV = discriminant validity, DV = dependent variable, IV = independent variable/control variable.

Prior to the in-person physiological assessment participants will complete several demographic and survey batteries. To minimize participant fatigue during the in-person assessment, each of these batteries will be completed online. To minimize survey fatigue, the online surveys will be completed in two sessions. Both must be completed before participants will be booked for the in-person session. We anticipate that each session of the online surveys will take between 20-25 mins. Participants will be directed to an appointment booking tool for the in-person sessions after they have completed the second survey. To ensure we can track participants identities between different survey waves by assigning participants a traceable alpha-numeric code. As this study contains identifiable information, additional steps will be taken to protect participants identities.

ICES Data and Consent: As part of our study, we will be asking participants for their permission to access their ICES data. ICES is an independent, not-for-profit research institute funded by the Ontario Ministry of Health which works on Ontario's health-related data. As part of our study, we will be asking for participants for permission to access their past and future health records. This data will be used to study long terms differences in mental and physical health outcomes relevant to our physiological assessment and long-term effect of our experimental intervention. Participants will be notified about our intention to collect ICES when they are invited to participate in the full study. The collection of the ICES data is intended for use in future publications.<sup>11</sup> Participants who decline access to their ICES data are still eligible to participate in the study.

#### Sample Recruitment Survey:

- Demographics: Age, Education, Ethnicity, Income, Gender and Sex, Religiosity, Religious Identification, Ideology, 7-point Likert-scale. -IV
- Short Big 5 Personality Scale. -IV
  - Collected to control for sample agreeableness.
- Out-group Emotion: -DV

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<sup>10</sup> Out-group emotions are measured on a 7-point scale. For the randomized selection of study participants 4-neutral will be coded as low on negative emotions.

<sup>11</sup> Thanks to Prof Adam Rahman, Schulich School of Medicine & Dentistry for suggesting we obtain consent to collect ICES data.

- “I feel strong emotions towards members of different racial, ethnic, or religious groups”.
- “I feel strong emotions or discomfort in the presence of different racial, ethnic, or religious groups”.
  - Strongly Disagree - Strongly Agree, 7-point scale.
- Three item measure of group antipathy: Like very much– Dislike very much, 7-point scale. Ethnic group measure will be used to identify viable sample. -DV
  - On average how do feel about people who belong to a different ethnic group than yourself?
  - On average how do you feel about people who belong to the same ethnic group as yourself?
  - On average how do you feel about politicians (distraction questions)
  - On average how do you feel about the existing public services offered in your city (garbage collection, public transit, snow removal)
    - We welcome feedback about this measure and its appropriateness to include during the sample recruitment. Re: Desirability Biases and Self-selection out of sample.

Survey 1: Participants complete the following measures online via Qualtrics. Participants will be compensated \$10 for completing this survey.

Survey Demographics (Age, Education, Ethnicity, Ethnicity of spouse, Income, Gender and Sex, Religiosity, Religious Identification, Ideology, 7-point Likert-scale).

- Emotion Regulation Questions (ERQ) (Gross & John 2003). -CV
  - 10-items, 7-point Likert-scale.
- Cognitive Emotion Regulation Questions (CERQ) (Garnefski & Kraaij, 2007). -CV
- Negative Emotions towards Out-groups Questionnaire (Mansell & Warren, 2022). -DV
  - 7 items, 7-point Likert scale.
- Contingent self-worth (DV). A measure of self-esteem captured by success in specific domains. -DSV
- Basic Ethnic Out-group Contact Q’s (Mansell & Warren, 2022). -IV
- Measure of group antipathy: On average how do feel about the following groups? Like very much– Dislike very much, 11-point scale. X groups in total, descriptive language, and number of groups to be revised. -DV
  - Whites (Europeans).
  - Asians (Chinese, Koreans, Japanese, etc.).
  - South Asians (Brown, Indian, Pakistani, Sri Lankans, West Indians).
  - Blacks (Africans, African Americans or Canadians, Caribbean).
  - Indigenous Canadians (People, First Nations People, Inuit, Metis).
  - Latinx (Central Mexican, Mexican, Spanish Speaking, South American).
  - Atheists.
  - Politicians.
  - Academics/Intellectuals.
  - **Note**: We would love feedback about the current or alternative measures of prejudice.

- Secondary Measure of group antipathy. Please order the preceding list of groups according to which group you like the most and which group you like the least. -DV

Survey 2: Participants complete the following measures online via Qualtrics. Participants will be compensated \$10 for completing this survey.

- Self-reported Perceived Stress: Cohen et al. (1983). -DSV
- Brief Coping Scale (Carver, 1997). -DSV
- Racial Resentment (Standard 4 item). -CV
- Perth Emotional Reactivity Scale (PERS) (Becerra et al. 2019). -IV
- Opposition to Immigration (European Social Values Survey, 10 items slider scale). -DV
- Social Dominance Orientation (Ho et al. 2015). -DV
- Aggressive Personality (Anger Rumination, Displaced Aggression, Revenge Planning) (Denson et al. 2006). -CV
- Self-efficacy? (Chen et al. 2001). -CV/DSV
- Note: Previously we included the Tri-partite (Authoritarian, Authoritarian Submission, and Traditional Conservatism) conservatism scale as a measure of discriminate validity (Duckitt et al. 2010). This scale correlates strongly with out-group antipathy and disgust sensitivity but does not correlate with self-reported emotion regulation (Mansell & Warren, 2022). Limitation of this scale, it is very long, 36-items 7-point Likert-scale.

**In-Person Assessment and Experiment:** Participants complete the following measures in-person at a local community centre. Participants will be compensated \$80 for completing the in-person assessment. The estimated length of the in-person assessment is 30-40 mins.

In-lab assessment will begin with a session overview and the attachment of sensors. Participants will be instructed on appropriate clothing to wear before attending the session. To avoid discomfort with the attachment of the heart rate sensor (placed on the heart) participants will be given the option to attach this sensor themselves. A habituation period will follow the attachment of sensors. During this period participants will answer a series of questions assessing their comfort and psychological state.

Questions:

- Ethnicity (White, Asian, South-Asian or Brown, Latinx)
- Mood Assessment. (Gross & Levenson, 1993)
- Sleep Assessment. (Ksiazkiewicz, 2020)
- Distraction Questions, Assessment of Neutral Images.
- Single item measure of stress (Elo et al. 2003)

Psychophysiological Measures:

- Skin conductance response (SCR)
- Heart Rate Variability (electrocardiography of interbeat interval)

- Body Temperature
- Single Electrode Electroencephalogram: Left PFC measuring LPP (Parvaz et al. 2012).
- Finger pulse amplitude
- Eye tracking

Facial Image Task: This study uses a modified version of the facial image task developed by Choi et al (2016)<sup>12</sup>. Participants review 40 images. 20 neutral images and 20 out-group facial images. Neutral images are taken from the IAPS and are used to prevent habituation. Negative images consist of 20 pre-rated out-group (black) faces taken from the Chicago facial database (Ma et al. 2015).<sup>13</sup> Selected images will have a neutral to moderately affective (Afraid, Angry, Dominant, Masculine, Threatening, or Untrustworthy) rating based on the Chicago database pre-ratings. A black/African American ethnicity are selected for two reasons. First, this ethnic group is among the most discriminated against in Canada. Second, the Chicago facial database contains a large sample of pre-rated black/African American faces.<sup>14</sup> To avoid habituation, images will be alternated between neutral and facial conditions. To avoid ordering effects participants will be randomly assigned to one of two conditions in which the images are present. These conditions will be the reciprocals of one another. To assess confounding from emotional reactivity and extinction, the presentation order of each stimulus will be tracked during the task allowing for a comparative analysis of the physiological effect of early vs. later images (Potter & Bolls, 2012).

Following Gross and Levenson (1993), participants are seated in a comfortable chair in a well-lit room. The dimensions of the room, cite location, date, time of day, temperature, participants mood, and level of sleep will be recorded for each participant. Participants are reminded by experimenters that we are “interested in learning more about emotions”. Sensors are attached and participants complete a short set of questions on present mood, mental state, and level of stress (demographic questions are complete prior to the experimental session). After completing the questionnaires subjects are told they will be viewing a series of images. Images will be shown on a 27-inch high-definition colour computer monitor 60cm from the subject (Parvaz et al. 2012).

Baseline assessment: pre-recorded instructions tell participants that the next screen will be blank for about one minute and that this time should be used to “clear your mind of all thoughts, feelings, and memories”. Baseline physiological recording is taken during this 1 min time.<sup>15</sup>

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<sup>12</sup> Choi et al. 2016 used 60 images. Total time is 9.5 minutes. Note: it is a lot of images and a long time to be focused on a single type of stimulus. I would expect habituation to task. Choi’s sample was only 102 Japanese students.

<sup>13</sup> Facial images were taken from Chicago face database (Ma et al., 2015). Images in the database are rated on a variety of characteristics (fear, anger, attractiveness) on a 1-7 Likert scales (1=Not at all, 7=Extremely).

<sup>14</sup> The original intention was to include a second racial target groups e.g., middle eastern faces or indigenous faces in addition to white faces. Unfortunately, neither the Chicago nor BU-3DFE database at the University of Birmingham, the two most reliable facial databases contain.

<sup>15</sup> Gross & Levenson find that participants show significant changes in psychophysiology during the administration of experimental instructions. Consequently, baseline physiological assessment must be taken prior to beginning the facial image task.

Image Protocol: blank screen 0.5s, fixation cross 0.5s, stimulus presentation 6s, inter-stimulus interval 2.5 s. Total time per image 9.5s. Total task time 6 minutes 33 seconds.

- Pre-task Set Instructions: Pre-recorded instructions tell participants that “*we will now be showing you a series of images. It is important to us that you look at each of these images carefully. If you find the images too distressing, just say “stop” to the assistant.*”
- Passive Reception Instructions: Pre-recorded instructions tell participants that “*When viewing the images please respond as you normally would.*”

Physiological Assessment of Hypotheses: Expressive suppression and prejudice. Expressive suppression is measured by comparing changes in three measures in response to the out-group image task. These measures are: 1) Skin Conductance Response (SCR), 2) Heart Rate (interbeat interval), 3) Finger Pulse Amplitude (blood volume / blood pressure). SCR measures general physiological arousal. Alone SCR is not sufficient to indicate expressive suppression. Expressive suppression is indicated by an interaction showing higher levels of SCR in combination with changes in heart rate (reduce heart rate) or finger pulse amplitude (higher blood volume). Physiologically, it is unlikely to observe reduce heart rate or higher blood pressure but not higher SCR. This is because in the absence of physiological arousal there is nothing expressively suppress.

Data coding, transformation, and analysis will follow standardized international guidelines for psychophysiological assessment. Censors will be attached to participants at the start of the study followed by a habituation period (censors can be uncomfortable!). During the habituation period participants will complete a short battery of questions measuring their mood, level of sleep, stress level, indicate their ethnicity, and complete a series of distractor questions about neutral images e.g., grey rocks. Following Gross & Levenson (1993), to avoid confounding the results baseline physiological assessment will be taken prior to the instructions for the experimental task.

Expectations Hypothesis 1: If H1 is true then the following responses are expected. Prejudicial attitudes should be correlated with psychological responses obtained during the Facial Image Experiment (summarized below). Specifically, prejudicial attitudes should be correlated with the interaction between increased SCR and either a) slowed heart rate, or b) increased finger pulse amplitude. A third interaction between slower heart rate and increased finger pulse amplitude is possible but unlikely except in cases of measurement error for SCR.

Expectations Hypothesis 2: H2 is *minimally true* if we observe a reduction in discriminatory attitudes in the treatment group who received cognitive reappraisal training. H2 is substantively true if a reduction in discriminatory attitudes in the target group also correlates with the following psychophysiological changes: 1) increases in Late Positive Potential (LLP) in the Left-PFC, indicating higher levels of cognitive reappraisal during out-group exposure; and/or, 2) decreases in SCR, indicating lower levels of physiological arousal in response to out-groups. Changes in heart rate or lower finger pulse amplitude would be meaningful, indicating individuals are not suppressing their emotions, but are not required.

A description of the intervention reappraisal training is provided below. The in-person assessment following the intervention is identical to the initial assessment.

## **Additional Post-Facial Image Task Assessments**

Racialized IAT (Implicit Assessment): IAT are measures of cognitive latency. The reliability of racial IATs for capturing prejudice, as opposed to cognitive biases, is not definitely proven, and currently is hotly debated. Objective of this measure to test whether implicit bias (cognitive latency) correlates with our explicit and psychophysiological measures of prejudice. The results of this measure may be published as a separate paper.

- We will use a standardized racial IAT available through Inquisit 7. Inquisit is a research application used to administer psychological tests.
- Estimated length of IAT 5-7 mins.

Image Appraisal Task: Participants will randomly view four static facial images, two in-group facial images and two out-group images (Black / African American faces). Because faces differ considerably in the information they convey, two images for each group are used so that reliability estimates can be calculated. In group images will be identified by asking participants to identify their self-reported ethnicity at the start of the experimental session (White, Asian, South-Asian or Brown, Latinx). Participants will be asked to complete a series of appraisal questions measuring the attributes of each face. Faces will be selected from Chicago facial database. Selected faces will have similar moderately affective ratings. Participants will be asked to complete a series of appraisal questions measuring the attributes of each face. The purpose of this measure is to explore whether individuals higher on emotional arousal and emotional suppression should show more negative appraisals of out-group faces as opposed to in-group faces and whether this difference correlates with the measure of out-group antipathy. Following Siemer et al, (2007) participants rate each face on 12 categories of appraisal based on the pre-rated categories in the Chicago facial database.<sup>16</sup>

- Angry
- Afraid
- Sad
- Disgusted
- Happy
- Attractive
- Dominant
- Feminine
- Masculine
- Surprised
- Threatening
- Trustworthy

Behavioral Measure: We are currently debating the inclusion of a behavioral measure of group prejudice/antipathy. The reason for considering a behavioural measure is that past research using anti-prejudice interventions demonstrates a divergence between attitudes and behaviors. Studies frequently show a reducing in prejudicial behavior, but not a reduction in prejudicial attitudes (Paluck & Green, 2009; Paluck & Green, 2021).

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<sup>16</sup> TBD whether these appraisals will be included into the regression model as separate variables or whether these would be combined to composite scales based on an exploratory factor analysis.



Currently we are considering two experimental games, a Third-Party Dictator game or a Trust Game. For the Trust Game, the game structure will need to follow a Holt-Lowry method for determining participants payouts, a standard method for determining payout in non-sequential economic games. Using this method, the amount recipients (Player 2) return to an investor (Player 1) are obtained prior to the investor game e.g., during survey 1 or survey 2. Investors would then be randomly matched with another participant.

- Third Party Dictator Game
  - Participants must divide a payment between two other participants whom they have no direct affiliation. As part of this task participants will vary in ethnic identity with participant 1 belong to the dictator's in-group and participant 2 belong to an out-group. This information will be disclosed to the dictator. The purpose of this task is to identify in-group bias under conditions of equal work.
- Trust/Investor Game
  - Two one-shot investor games were participants decided how much money to offer their counterpart for a chance of reward. In game 1 the counterpart's ethnic identity is the same as the participant. In game 2 the counterpart's ethnic identity is identified to be different from the participant.

Importantly, following the theory of bounded generalized reciprocity, the instructions will clearly emphasize that none of the other participants knows the ethnic identity of the dictator or investor. Furthermore, these participants will never be able to allocate resources to the participant. This principle is necessary to rule out confounding for minimal group identities (Yamagishi et al. 1999)

#### 8-Week Experimental Intervention: Training in the Cognitive Reappraisal of Negative Emotions.

The final component of this study is an 8-week intervention followed by a complete replication of the original survey items and in-person assessment. Participants who complete all these exercises will be paid \$160. To motivate completion, this money will be paid as a single lump sum after the second physiological reassessment (pending ethnics approval). Each weekly session will be less than 10 mins and can be completed online via computer, tablet, or cellphone.

Only participants who successfully complete the physiological assessment and who are identified as belonging to the high out-group antipathy participate in the 8-week intervention. This decision is based on three considerations: 1) budgetary constraints, 2) the need to ensure that enough high antipathy participants complete the intervention, 3) the ability to reassess each participant within 2 weeks of completing the intervention.<sup>17</sup>

Participants in the intervention will be randomly assigned to either the treatment or control condition. To maximize statistical power the randomization will be weighted towards the treatment condition, 60% randomly assigned to treatment and 40% to control. This decision is based on best practices in experimental research for expected heterogeneity in response to the treatment vs. the control conditions. In other words, in situations where the average treatment effect is not informative because results are conditioned on some third variable e.g., stress, late positive potential, number of exercises completed.

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<sup>17</sup> More work needs to be done to decide how invitations to the intervention will be managed. Suggestions are welcome!

Exercises: Participants in the treatment and control groups will be asked to complete a series of weekly exercises involving memory or cognitive reappraisal. The exercises and instructions will be distributed to participants weekly in an online format, a Qualtrics survey. The survey will also record the self-reported number of times a participant completes the previous weeks exercises.

Prior to beginning the exercises, the control and treatment groups will read a short vignette describing the benefits of task. Participants in the control group will read about health benefits of exercising their memory. Participants in the treatment group will read about the negative health effects of emotional suppression and the positive benefits of cognitive reappraisal. These descriptions are intended to further motivate task and intervention compliance. To help ensure compliance participants will be encouraged to record basic information about their thoughts during the exercises in an open response box embedded in the Qualtrics survey.

Control Group: Participants in the control group will complete a series of memory exercises for 8 weeks. Specifically, participants will be asked to remember a variety of different topics e.g., a news story, a birthday, an anniversary, sports game etc. The topics will vary each week, but participants will have flexibility to select an event which is relevant to them within each topic. To maintain consistency with the treatment group each week will involve two exercises. Participants are encouraged to repeat the exercise as many times as the like each week. Participants will be asked to report the number of times they preformed the task. Memory exercises are selected as the task in the control group because they are cognitively effortful but do not confound with the exercises in the treatment group. Memory exercises do not present challenges to accessibility and can be done repeatedly.

Treatment Group: Participants in the treatment group will be taught to “positively” reappraise their emotions and feelings towards others. To address possible non-compliance participants will complete two reappraisal exercises, one directed at reappraising situations in their personal or professional lives, a second about reappraising their emotions towards different groups. As with the control group the topics will vary each week. Participants are encouraged to repeat the exercise as many times as the like each week. Participants will be asked to report the number of times they preformed the task.

Each reappraisal task will follow the basic structure outlined below. A visual example taken from a project on partisan animosity (Mansell & Turgeon, 2021) is included in the appendix.

1. Remember: Sometimes emotions are challenging to manage. Remember a past disagreement between yourself and [*Emotional Target: Personal relationship vs. Out-group*] where your emotions got the better of you. 1 minute pause.
2. Reflect. Participants are asked to think about a past situation or disagreement. As part of the reflection, we further ask participants to think about how their emotions stopped them from reaching a positive outcome, or how their behavior was inappropriate. 1 min pause.
3. Rethinking: Thinking about the same past situation or disagreement, we ask participants to take one minute to think about either: how acting on their emotions different or changing their behavior helped them reach a more positive outcome? Or, what positive lessons they can take away from this inappropriate behavior? For example, can this past situation teach them about resilience, patience, tolerance? 1 min pause.

Intervention Treatment Group: 8-week Program, Modelled around two 2 mins exercises

- Week 1: Introduction to Reappraisal & Personal Relationship
  - Emotional Targets: Family Member & Ethnic Out-group
- Week 2:
  - Personal Target: Loved One
  - Out-group Target: Reflected on source of feeling discomfort towards out-group
- Week 3:
  - Personal Target: Co-worker
  - Out-group Target: Appropriateness /overreaction of feelings towards out-group in the given context
- Week 4:
  - Personal Targets: Family Member
  - Out-group Target: Learning Patience for others
- Week 5:
  - Emotional Targets: Close Friend
  - Out-group Target: Tolerance of difference
- Week 6:
  - Personal Target: Loved One
  - Out-group Target: Reflected on source of feeling discomfort towards out-group
- Week 7:
  - Personal Target: Co-worker
  - Out-group Target: Appropriateness /overreaction of feelings towards out-group in the given context
- Week 8:
  - Personal Targets: Family Member
  - Out-group Target: Learning Patience for others /Tolerance

Physiological Assessment:

Participants will complete for a second time all items in survey 1 & 2 as well as the all items from the in-person assessment. This includes the Racialized IAT, Facial Image Task, Appraisal Task and if applicable the economic game.<sup>18</sup>

**6 Month Attitude Follow-up:** Approximately six months after the intervention all responses who completed second in-person assessment will be invited to complete a short battery of questions. These include the ERQ, the CERQ, the aggressive personality scale, the Chen efficacy scale, and multiple measures of group antipathy. Full list of items is not finalized. Survey will be constrained to be less than 15 mins. Participants will be compensated \$20 for completing the survey. To maximize comparability, if sufficient funds are remaining (there should be) participants from the low out-group antipathy group who did not complete the intervention will also be invited to complete these items.

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<sup>18</sup> We will look to see what items from Survey 1 and Survey 2 can be dropped from the reassessment to avoid the subjects annoying.

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# Introduction: 15 sec display time.

- In a moment, you will be asked to take part in a simple cognitive task. To the best of your ability please follow the instructions.



Instructions: 1 min display time.

## **Remember**

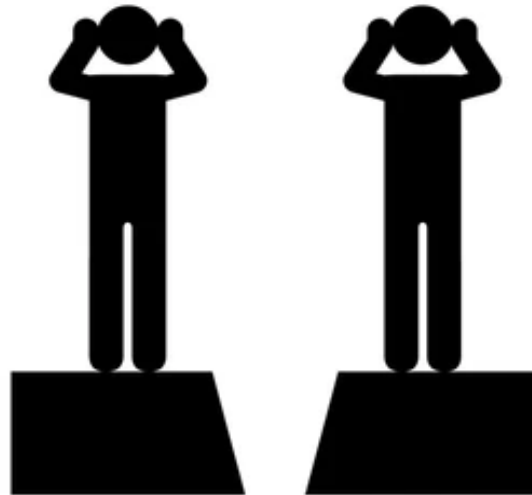
- Sometimes emotions are challenging to manage. Remember a past disagreement between yourself and someone close to you where your emotions got the better of both of you.



Reflection Period: 30 second display time.

## Reflect

- Thinking about that past disagreement. Think about how your emotions stopped you from reaching a positive outcome?



# Reappraisal: 1 min display time.

## Rethink & Reflect

- Still thinking about the past disagreement, take one minute to think about how acting on your emotions differently would have helped you reach a mutually positive outcome.



# Question Instructions: 15 sec display time.

## **Apply**

You will now complete a series of survey questions. When answering these question, try to keep in mind the life event you just remembered. In particular, keep in mind how managing your emotions differently might have lead to more mutually positive outcomes.

