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Fair is foul and foul is fair; moral disgust, emotion regulation and childhood trauma

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Abstract

Experiencing disgust leads to harsher judgements of morality in others and oneself (cf. Schnall et al., 2008), which could lead to psychological distress and outgroup discrimination. Emotion regulation techniques could help reduce the harshness of these judgements, yet some factors could influence the effectiveness of these techniques e.g. presence of childhood trauma. The current study hypothesised a moderated mediation model that explored; a) the effect of cognitive reappraisal on the experience of disgust, b) cognitive reappraisal as a mediator to reduce the experience of disgust and thus reduce the harshness of moral judgements, c) whether childhood trauma could moderate this relationship.

Using a 2x3 between-participants design, an experiment was performed via online survey. Participants ($n = 617$; 18-81 years) received three emotion regulation instructions whilst watching either a disgust-eliciting video clip or a neutral video clip. After viewing the clip, several questionnaires on morality, trauma and personality were administered.

The results showed that expressive suppression rather than cognitive reappraisal reduced the experience of disgust. Regression analyses revealed that reappraisal did not mediate the relationship of disgust on moral judgements. Childhood trauma significantly predicted a reduced ability to reappraise but not suppress compared to those who did not report childhood trauma. No significant effect was found for trauma on the relationship between disgust and moral judgement. Over-reliance on suppression rather than reappraisal is a feature common in psychopathology, but suppression in response to acute disgust is likely an adaptive emotion regulation strategy.

Keywords: disgust, emotion regulation, childhood trauma, morality

Introduction

Morality has been a topic debated since before the Greeks sported togas (cf. Crisp, 2014). Rationality was often lauded as the way to arrive at righteousness, such as Kant's (1996) categorical imperative; a rule of thumb that could be universally applied. However, research shows that there are many stumbling blocks in applying morality consistently, such as the evocation of emotions. Thinking of one's own death, and the fear that death induced, led to judges and undergraduate students recommending harsher bail bonds for those deemed to violate cultural norms (Rosenblatt et al., 1989). Guilt often prompts guilty parties to act more ethically and make up for their transgressions (Lewis, 1993; Haidt, 2003). Another emotion that is often overlooked in this context however, and under-studied even to the point of being termed the "forgotten emotion of psychiatry" (Phillips et al., 1998, p.1), is disgust.

Disgust is a negatively valenced emotion that tends to stimulate an avoidance response (Olatunji et al., 2017b). The evolutionary advantage of disgust is often interpreted as a self-preservatory instinct to protect humans from disease (Olatunji et al., 2017b). This interpretation laid the basis for Matchett and Davey's (1991) Disease Avoidance Model. According to this model, disease avoidance is associated with the emotions of fear and disgust toward disease- or threat-related animals (Oaten et al., 2009; Lundberg et al., 2021). These negative emotions protect us from contact with toxins and pathogens and prevent disease acquisition (Matchett and Davey, 1991; Curtis et al., 2011; Sapolsky, 2017). For example, videos of burn victims will often evoke a withdrawal response in participants, thereby ensuring their safety by avoidance of the stimulus (Davidson et al., 1990). Additionally, Paul Rozin and colleagues (2008) theorised that fear of contamination may have originally involved physical contaminants (like disease), but "advanced cognitive capacities brought abstract thinking that

facilitate[d] concerns over social contaminants (like ideas, or values)” (Hodson et al., 2013, p.196). In other words, new types of disgust arose over time such as sociomoral disgust.

Sociomoral or moral disgust is the disgust elicited by transgressions of society’s social and moral norms (Chapman & Anderson, 2013), and it functions to protect society and the social order of its members (Rozin, Haidt, & McCauley, 1994) from those engaging in morally disgusting acts.

Here, disgust is explained as a fear of the other as a potential harbinger of societal collapse.

Indeed, studies have found a link between disgust and judgements of others’ behaviour.

In several studies, participants exposed to a disgusting stimulus (e.g. foul smell or taste), judged *impure* or *morally questionable* behaviour more harshly than individuals not exposed to the disgust elicitor (Schnall et al., 2008; Eskine et al., 2011; Horberg et al., 2009). Disgust sensitivity, characterised by an individual’s negative appraisal of the experience of disgust (van Overveld et al., 2006), is associated with increased moral hypervigilance (Jones & Fitness, 2008), social conservatism (Inbar et al., 2009a) and ingroup favouritism (Hodson & Costello, 2007). Disgust sensitivity, combined with disgust propensity (an individual’s tendency to experience disgust; van Overveld et al., 2006), is associated with conservative attitudes towards abortion and same-sex marriage (Inbar et al., 2009b). Moreover, inducing disgust with foul smells resulted in more conservative attitudes and less warmth towards homosexual men in individuals high in disgust propensity compared with those low in disgust propensity (Inbar et al., 2009a). Each of the aforementioned studies showed that inducing disgust in participants increased the severity of moral judgements towards others.

In studies on participants’ own behaviour, immoral behaviour has led to sensations of moral disgust. In one study (Zhong & Liljenquist, 2006), after recalling either an ethical or unethical deed that participants had committed, participants were allowed to take a pencil or

antiseptic wipes as a token of appreciation for their participation. Those who recalled a misdeed were more likely to choose the wipes; a means of wiping away the memory of their immoral actions. When the study was replicated, the participants desired to wash their face rather than their hands, possibly reflecting a sense of shame they felt as a result of their unethical behaviour (Lee et al., 2015). Additionally, Schnall et al. (2008) found that a short clip of a disgust stimulus increased moral harshness - unless participants washed their hands after the film. In this case, handwashing nullified the effect. These studies suggest that when participants experience disgust, they also display higher levels of moral disgust towards their own behaviours.

While disgust can be alleviated through cleansing of the self, another strategy of coping with disgust is emotion regulation. Gross (2014) defines emotion regulation as a process by which individuals influence what emotions they have, when they occur, and how they experience and express them. One effective emotion regulation strategy is cognitive reappraisal (Webb et al., 2012), defined by Gross and John (2003) as the attempt to reinterpret an emotion-eliciting situation in a way that alters its meaning and changes its emotional impact. Another strategy is expressive suppression; the attempt to hide, inhibit or reduce ongoing emotion-expressive behaviour (Gross & John, 2003). When exposed to disgust-relevant content, reappraisal appears to be most effective, as it leads to less distress and affects memory less than suppression (Olatunji et al., 2017a, Richards & Gross, 2000). This should then lead to decisions of more clarity and consideration. Ability to engage in effective emotion regulation, with a higher tendency to reappraise than to suppress, may be associated with more adaptive functioning and reduced psychopathology and lower levels of depression, anxiety and PTSD symptoms (Eftekhari et al., 2009; Gross & John, 2003). More importantly for the present context, reappraisal also ameliorates the harshness of moral decision-making. Feinberg et al. (2014)

assigned conservatives to a reappraisal condition, and found they were more accepting of homosexual relationships relative to their counterparts in the control condition. Notably, these reappraisal conservatives showed similar attitudes toward homosexual relationships as liberal participants, suggesting that disgust reappraisal may temper harsh judgements on moral issues (Feinberg et al., 2014). Thus, effective emotion regulation of disgust may lead to less judgement and more acceptance of out-group members compared to those who don't regulate their emotions.

While the ability to self-regulate is the cornerstone for adaptive success (Richards & Gross, 2000, p.420), several factors may impede effective emotion regulation. One such factor could be childhood trauma. Childhood trauma can lead to emotion regulation deficits, as well as reduced intellectual ability, reduced attention, working memory deficits, low levels of academic achievement, low self-confidence, and mental health problems (Rutter et al., 2006). Trauma could affect the development of emotional cognitive ability by a dysregulation of the hypothalamic-pituitary-adrenocortical stress response system (Murphy et al., 2022). This dysregulation is believed to alter individuals' brain physiology and functioning, impacting their ability to regulate emotions and predisposing exposed individuals to psychiatric vulnerabilities later in life (Teicher et al., 2016). PTSD (Post-Traumatic Stress Disorder) patients showed poor emotion processing and behavioural inhibition (Shin et al., 2001; Stevens et al., 2016), while traumatised adolescents exhibited cognitive deficits in inhibitory control (Marshall et al., 2016). As childhood trauma impedes the ability to regulate emotions, it may impede the process of moral decision-making.

In sum, an inability to effectively regulate emotions like disgust may lead to unmitigated disgust affecting moral judgements. Furthermore, as trauma can have a detrimental impact on the

development of effective emotion regulation, high levels of childhood trauma may impact the strength of this relationship through inability to effectively regulate emotion. Therefore, the following hypotheses will be examined in this study:

H1: Cognitive reappraisal will reduce the experience of disgust in participants;

H2: Cognitive reappraisal will mediate the relationship between disgust and moral decision-making leading to less harsh moral judgements;

H3: High levels of childhood trauma will moderate the relationship between disgust and moral judgements compared to those who do not report childhood trauma, leading to harsher judgements in those with high levels of trauma;

H4: Higher incidences of childhood trauma will correlate with reduced ability to regulate emotion compared to those with low incidences of childhood trauma.

Method

Participants:

The sample consisted of participants recruited from the general population. Anyone aged above 18 years was eligible to take part. The survey was completed by participants around the world, with the majority coming from the Republic of Ireland, the Netherlands, and the United Kingdom. A priori power analysis was conducted using G*Power version 3.1.9.7 (Faul et al., 2007) for sample size estimation, based on data from Olatunji et al.'s meta-analysis on disgust proneness in anxiety and related disorders (2017b) ($N = 43$). The effect size in Olatunji et al.'s (2017a) meta-analysis was 0.2, considered to be small using Cohen's (2013) criteria. With a significance criterion of $\alpha = 0.05$ and power = 0.80, the minimum sample size needed with this effect size was $N = 68$ for the current analyses. There were 800 participants in total. However,

183 had not completed the study (less than 85% complete) so their data was deleted. Thus, the obtained sample size of $N = 617$ was suitable to test the study hypotheses. Of the 617 valid participants, 610 provided their gender, and 589 provided their age. 269 females (43.2%), 336 males (53.9%) and 5 non-binary persons (0.8%) took part. The mean age of the sample was 35 years ($SD = 10.82$; range = 18-81 years).

There were six conditions in this 2x3 experimental design with 2 emotions induced (disgust or neutral) and 3 emotion regulation (ER) interventions (Cognitive Reappraisal, Expressive Suppression, No Emotion Regulation). The three conditions who watched the disgust-eliciting video will be referred to together as the Disgust conditions, and the three conditions who watched the glass-blowing video will be referred to as the Control conditions.

Measures:

Disgust Proneness. Participants rated their agreement with a number of disgust-related statements on the *Disgust Propensity and Sensitivity Scale - Revised (DPSS-R)* (van Overveld et al., 2006), containing 12 items rated on a 5-point Likert scale from 1 (= *Never*) to 5 (= *Always*) ascertaining the participant's disgust propensity (DP) and disgust sensitivity (DS), respectively. Disgust propensity relates to one's general tendency to experience disgust whereas disgust sensitivity is characterised by one's negative appraisal of the experience of disgust (van Overveld et al., 2006). Higher scores on the DPSS-R indicate higher disgust proneness. Examples of disgust-related statements on the DPSS-R are "I avoid disgusting things" and "I think feeling disgust is bad for me". A previous study demonstrated good reliability for both the propensity ($\alpha = 0.83$; present study (PS): $\alpha = 0.76$) and sensitivity ($\alpha = 0.80$; PS: $\alpha = 0.82$) scales of the DPSS-R. Further, they shared a moderate to strong positive relation ($r = 0.59$; PS: $r = 0.67$) with one another (Fergus & Valentiner, 2009).

Childhood trauma was assessed using the *Childhood Trauma Questionnaire - Short Form (CTQ-SF)* (Bernstein et al., 1998), consisting of 28 items across five subscales on emotional abuse, emotional neglect, physical abuse, physical neglect and sexual abuse. Each item is scored on a 5-point Likert scale ranging from 1 (= *never true*) to 5 (= *very often true*). An example of the items is “People in my family said hurtful or insulting things to me”. The CTQ-SF demonstrated strong internal consistency for the entire measure ($\alpha = 0.91$; present study [PS: $\alpha = 0.93$]), while each subscale demonstrated alpha coefficients of 0.58; PS: 0.75 (Physical Neglect), 0.69; PS: 0.90 (Physical Abuse), 0.83; PS: 0.86 (Emotional Abuse), 0.85; PS: 0.84 (Emotional Neglect), and 0.94; PS: 0.92 (Sexual Abuse), respectively (Scher et al., 2001).

Trait Emotion Regulation: The Emotion Regulation Questionnaire (ERQ) (Gross & John, 2003) measured tendency to engage in cognitive reappraisal and expressive suppression. The questionnaire contains 10 items relating to two subscales on reappraisal and suppression, such as “I keep my emotions to myself” and “I control my emotions by changing the way I think about the situation I’m in”, respectively. These items are rated on a 7-point Likert scale ranging from 1 (= *strongly disagree*) to 5 (= *strongly agree*). The ERQ demonstrated strong internal consistency for both Reappraisal ($\alpha = 0.89$; PS: $\alpha = 0.82$) and Suppression ($\alpha = 0.77$; Sörman et al., 2021; PS: $\alpha = 0.73$).

Dependent Variable: The Moral Foundations Questionnaire (MFQ) (Graham et al., 2008) measured moral decision-making, consisting of 30 items on a level of agreement with certain morality-focused statements across 5 subscales. Part One asked participants to rate how relevant certain moral considerations are when rating right and wrong, using a 6-point Likert scale from 0 (= *not at all relevant*) to 5 (= *extremely relevant*). Examples of these moral

considerations account for whether or not “someone suffered emotionally” or “violated standards of purity and decency”. Part Two used a 6-point Likert scale ranging from 0 (= *Strongly Disagree*) to 5 (= *Strongly Agree*) to indicate agreement with statements such as “Compassion for those who are suffering is the most crucial virtue” and “Chastity is an important and valuable virtue”. Graham et al. (2011) found the average internal consistency of each subscale to be acceptable ($\alpha = 0.73$; PS: $\alpha = 0.67$) for all subscales: Harm ($\alpha = 0.69$; PS: $\alpha = 0.71$), Fairness ($\alpha = 0.65$; PS: $\alpha = 0.69$), Ingroup ($\alpha = 0.71$; PS: $\alpha = 0.63$) Authority ($\alpha = 0.74$; PS: $\alpha = 0.64$) and Purity ($\alpha = 0.84$; PS: $\alpha = 0.68$).

Confounding Variable. To control for the confounding effects of participants’ tendency to experience positive or negative emotions (trait affect), the *Positive and Negative Affect Schedule-Short Form (PANAS-SF)* (Watson et al., 1988) was administered to determine the levels of positive and negative affect participants have experienced in the past week. The questionnaire consists of 20 items, such as “Enthusiastic” and “Irritable” that must be rated on a 5-point Likert scale ranging from 1 (= *very slightly or not at all*) to 5 (= *extremely*). The PANAS-SF demonstrated high internal consistency ($\alpha = 0.85$; PS: $\alpha = 0.85$), good test-retest reliability ($\alpha = 0.71$) and high internal validity (Rossi & Pourtois, 2012).

Manipulation Check. Each participant completed the *Differential Emotions Scale - Modified (mDES)* (Gross & Levenson, 1995) to rate their levels of disgust following the video clips. The scale allows participants to consider their emotions over the past two weeks and rate their strongest experience of each of 10 emotions on a 5 point Likert scale from 1 (= *Not At All*) to 5 (= *Extremely*), on items such as “I felt amused, fun-loving, silly” and “I felt disgust, distaste, revulsion”. Galanakis et al. (2016) demonstrated a Cronbach’s Alpha of ($\alpha = 0.75$;

PS: $\alpha = 0.81$) for the mDES scale, and a Spearman-Brown coefficient of ($\alpha = 0.75$) for the split-half reliability index.

Engagement in Emotion Regulation: To check whether participants used the instructed emotion regulation types during the conditions, each participant carried out the *Emotion Regulation Response Scale (ERRS)* adapted by Olatunji et al. (2017a) from Dunn et al. (2009) to assess how much they engaged in cognitive reappraisal and suppression. The scale contains four items used to assess participants' regulation strategies during the videos on a scale of 0 (= *Not At All*) to 100 (= *Extremely*). In the present study, the scale demonstrated strong internal consistency ($\alpha = 0.81$) (Please see Appendix A-G for each questionnaire).

Each of the Disgust groups watched a disgust-eliciting video clip consisting of edited excerpts from MTV's *Jackass* (2000) containing an egg-eating contest and a milk-drinking contest, during which participants vomit excessively, while the Control condition watched a short clip taken from a documentary by Bert Haanstra (1958) on the making of glass. Both clips were adapted from De Jong et al. (2011), with the *Jackass* clips found to effectively evoke disgust in participants. While the glass-making clip evoked some happiness in participants (De Jong et al., 2011), it did not evoke strong emotions and can be considered as a proper neutral clip. To manipulate emotion regulation, participants received different emotion regulation instructions per condition. Please see Appendix H for the precise instructions (adapted from Olatunji, 2017a). These instructions were successfully used by Olatunji (2017a) and Gross (1998) to train emotion regulation in their respective studies.

Procedure:

An online survey experiment was made in Qualtrics, a web-based tool used to conduct the study. Participants were recruited using a poster displayed on the campus noticeboards of

Utrecht University for 1 month, and promoted on the social media platforms Instagram, Facebook, Reddit and Whatsapp.

Participants were briefed on the study, that data would be processed anonymously and that they were not remunerated for their participation. Participants were informed that five vouchers of €10 were raffled amongst participants who fully completed the study. Informed consent was obtained from all participants before engaging in the study.

Participants completed the first four questionnaires in this order: Disgust Propensity and Sensitivity - Revised (DPSS-R), Childhood Trauma Questionnaire (CTQ-SF), Positive and Negative Affect Scale (PANAS) and the Emotion Regulation Questionnaire (ERQ). Next, they were randomly assigned to one of six conditions; Cognitive Reappraisal, Expressive Suppression, No Emotion Regulation or one of three corresponding Control conditions. They first received their respective emotion regulation instructions. Next, they watched either the disgust or neutral clip, depending on their allocated condition.

Afterwards, participants completed the following measures; the Moral Foundations Questionnaire (MFQ), Modified Differential Emotions Scale (mDES), and Emotion Regulation Response Scale (ERRS). The participants were thanked for their participation and given background information on the study. In case negative emotions arose from the completion of the study, participants were instructed that they could contact the researcher. The study protocol was ethically reviewed and approved by the Faculty Ethics Review Committee (FERB) of Utrecht University, the Netherlands.

Results:

IBM SPSS Statistics (Version 28.0.1.0) was used to analyse the data. Please see Appendix J for means and standard deviations for all surveys by condition. Due to staggered data

collection, participants per condition were unequal. As the Kaiser-Meyer-Olkin measure of sampling adequacy was found to be greater than 0.60 (0.88) and Bartlett's test of sphericity was significant ($p < 0.01$), the data was deemed satisfactory for analysis.

A one-way ANOVA was conducted between the Disgust and Control conditions as a manipulation check. The ANOVA determined whether the disgust video elicited disgust as measured by the mDES in the participants in the disgust conditions compared to the control conditions. The results indicate a significant difference in the amount of disgust reported between the conditions ($F(1, 608) = 61.14, p < 0.01$). Scores on the disgust subscale of the Modified Differential Emotions Scale (mDES) were higher for the disgust conditions ($M = 3.37, SD = 1.24$) than the control conditions ($M = 2.57, SD = 1.07$). Therefore, the manipulations induced significantly more disgust in the disgust conditions than in the control conditions and were successful. A more elaborate analysis of disgust predicting scores on the MFQ can be found in Appendix K.

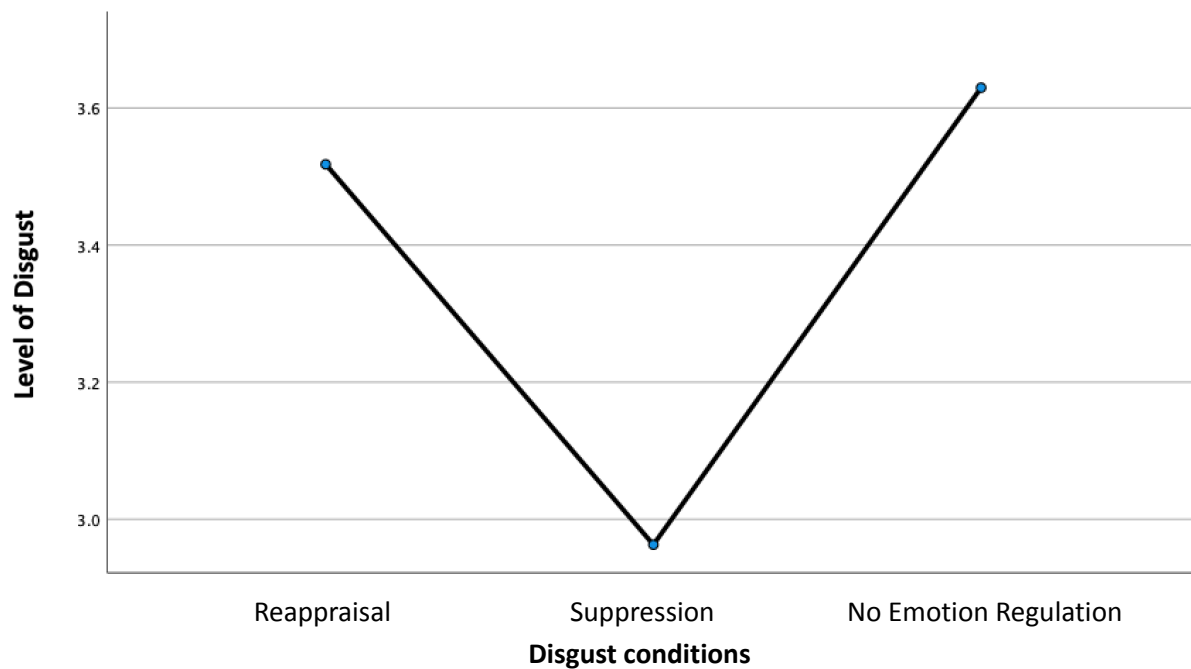
Cognitive Reappraisal and Disgust:

To test H1, to determine whether cognitive reappraisal reduces the experience of disgust in participants (as measured on the mDES), a one-way ANOVA was conducted between the Disgust conditions. The results indicate a significant difference in the amount of disgust between the conditions ($F(2, 161) = 4.66, p = 0.01$), see Figure 1. As the Kolmogorov-Smirnoff test was significant, equal variances were not assumed and so post hoc tests were conducted using Tamhane's T2 test. Tamhane's pairwise comparison test found that the mean experience of disgust was significantly lower for Suppression ($M = 2.96, SD = 1.36$) compared to No Emotion Regulation ($M = 3.63, SD = 1.10$) ($p = 0.02, 95\% \text{ C.I.} = [-1.25, -0.09]$). Most importantly for the present hypothesis, there was no statistically significant difference in mean scores between

Reappraisal ($M = 3.52$, $SD = 1.18$) and Suppression ($p = 0.07$) or between Reappraisal and NER ($p = 0.94$). As this is just outside the margin of significance, this rejects H1.

Figure 1

Level of Disgust of Reappraisal, Suppression and No Emotion Regulation in the Disgust Condition.



Cognitive Reappraisal and Moral Judgements:

Multiple regression analyses were performed to examine whether reappraisal mediates the effect of disgust on moral judgements (H2), using the PROCESS module (Hayes, 2012). The assumptions of multiple regression analysis were accepted. The two variables were created manually for the predictors in this regression. First, a variable was made where the disgust conditions were denoted with 1, while the control conditions were denoted with 2. For emotion regulation, a variable was made where reappraisal instructions were denoted with 1, suppression

denoted with 2 and no emotion regulation denoted with 3. The overall regression was statistically significant ($R^2 = 0.81$, $F(3, 612) = 857.13$, $p < 0.01$), explaining 81% of the variance in scores on moral judgements. The results revealed no significant indirect effect of reappraisal on moral judgements ($\beta = -0.55$, $F(1, 103) = 0.07$; $p = 0.35$). Furthermore, the direct effect of disgust on moral judgements in the presence of reappraisal was also not significant ($\beta = -0.26$, $p = 0.69$). Thus, reappraisal does not mediate the relationship between disgust and moral decision-making. Hence, H2 is rejected.

Childhood Trauma and Moral Judgements:

Multiple regression analyses examined whether higher incidences of childhood trauma (CTQ-SF) moderate harsher judgements (as indexed by the Moral Foundations Questionnaire (MFQ) using the PROCESS module (Hayes, 2012)¹. The results revealed no significant overall effect of trauma on the relationship between disgust and moral judgement ($R^2 < 0.01$, $F(1, 612) = 0.06$, $p = 0.83$), explaining less than 1% of the variance in scores on moral judgements. There was no main effect of trauma on moral judgement ($\beta = -0.06$, $t(612) = -0.51$, $p = 0.60$). Furthermore, the interaction effect of trauma and disgust on moral judgement was also not significant ($\beta = 0.01$, $t(612) = 0.24$, $p = 0.81$). This shows that childhood trauma has no influence on the relationship between disgust and moral judgements. Therefore, H3 is rejected.

Childhood Trauma and Emotion Regulation:

A simple linear regression was used to test if scores on the Childhood Trauma Questionnaire significantly predicted lower self-reported use of emotion regulation strategies on the Emotion Regulation Questionnaire (ERQ). The overall regression was statistically significant ($R^2 = 0.03$, $F(1, 615) = 17.04$, $p < 0.01$), explaining 3% of the variance in use of emotion

¹ All assumptions of multiple regressions were tested and accepted, except for multicollinearity. However, as the regression was not significant, and a degree of multicollinearity is to be expected within moderation designs (cf. Wooldridge et al., 2016, p.98), we proceeded with the analysis.

regulation strategies. Further, higher scores on the CTQ significantly predicted lower use of emotion regulation strategies ($\beta = -0.08, p < 0.01$). This shows that a high incidence of childhood trauma leads to a reduced ability to regulate emotions. Hence, H4 is accepted.

Exploratory Analysis.

Considering the hypothesis regarding childhood trauma and its impact on emotion regulation, further exploratory analysis was conducted on the ERQ subscales of Cognitive Reappraisal and Expressive Suppression. Simple linear regression was used to determine where the differences in emotion regulation strategies lay as a result of higher childhood trauma. For Cognitive Reappraisal, the simple regression was statistically significant ($R^2 = 0.09, F(1, 615) = 61.58, p < 0.01$), showing that higher scores on the CTQ significantly predicted lower use of cognitive reappraisal strategies ($\beta = -0.09, p < 0.01$). For Expressive Suppression, the simple regression was not statistically significant ($R^2 = 0.01, F(1, 615) = 3.36, p = 0.07$), showing that higher scores on the CTQ did not significantly predict lower use of expressive suppression strategies ($\beta = 0.02, p = 0.07$). While results for suppression were just outside the margin of statistical significance, and these results should be taken with caution, it appears that childhood trauma leads to a reduced ability to reappraise but didn't impact the ability to suppress.

Disgust propensity and sensitivity both had a positive association with higher scores on each subscale of the MFQ, with disgust sensitivity found to be the strongest positive predictor of scores on the Purity/Sanctity subscale. Please see Appendix K for an elaboration on these analyses.

Discussion

The present study aimed to examine the relationship between disgust and moral judgements, and whether these moral judgements were mediated by emotion regulation and

moderated by childhood trauma. The present study also examined the effect of childhood trauma and emotion regulation on moral decision-making after the induction of disgust.

The present study did not find an effect of disgust on moral decision-making, despite each disgust condition reporting disgust being elicited. This is contrary to Schnall et al. (2008) and Inbar et al. (2009a) who found that disgust led to harsher moral decision-making. The present study also found no relationship between reappraisal and reduced harshness of moral decision-making. Thus, it did not replicate Feinberg et al.'s (2014) finding that reappraisal reduces the harshness of moral decision-making. As such, there was no evidence found to support the proposed mediation model.

A surprising finding was the effectiveness of suppression to decrease disgust. Reappraisal had been found by Olatunji et al. (2017a) and Richards & Gross (2000) to be most effective at decreasing disgust, yet in the present study, suppression led to significantly lower levels of disgust compared to reappraisal (as reported on the mDES). It appears that reappraisal does not significantly decrease disgust more than no emotion regulation instructions, but suppression is better than no emotion regulation to decrease disgust. Suppression was not significantly better than reappraisal at reducing disgust, although the results were just outside the margin of statistical significance ($p = 0.07$). Cognitive reappraisal did not reduce the experience of disgust in the present study. While Olatunji et al. (2017a) found reappraisal to be useful in reducing the experience of negative emotions, Sheppes and Meiran (2007) noted that reappraisal may be less effective after the emotion response has taken place (compared to distraction). It is possible that the self-monitoring required in using reappraisal required a cognitive cost, resulting in a failure of effective reappraisal (Baumeister et al., 1998). It is likely that suppression is a skill that is hard to 'turn off' once it is learned, and since it does not engender the same cognitive cost as

reappraisal, it may be easier and more natural and automatic to engage in, as the present study suggests.

The present study found that childhood trauma is associated with lower self-reported use of emotion regulation strategies. This confirms prior research by Rutter et al. (2006) and Teicher et al. (2016). However, the present study showed that only the ability to reappraise was reduced, while suppression was not impeded. This supports earlier research (Eftekhari et al., 2009), which found that those who were low in reappraisal usage but moderate in suppression usage reported the highest levels of depression, anxiety, and PTSD; those who were high in reappraisal and low suppression reported lower levels of depression, anxiety, and PTSD symptoms. While Eftekhari et al. (2009) cautioned that reduced emotion regulation “may be a consequence and not a cause of psychopathology”, reduced emotion regulation is likely either a risk factor or a marker of psychopathology. The reduced use of reappraisal found by those with high levels of trauma in the present study, may provide a mechanism by which childhood trauma perpetuates a cycle of mental ill-health and disorder symptomatology. Suppression of trauma-related memories may threaten a person’s sense of self and lead to high levels of defensiveness and cognitive biases (Eysenck, 2000), while thought suppression itself may lead to a paradoxical post-suppression rebound fueling the very thoughts it is trying to suppress (Wenzlaff & Wegner, 2000). Engaging in suppression more easily may aid these mechanisms to perpetuate disorder symptomatology. However, as acute disgust towards a video is an emotion likely without long-term term consequences, suppression of acute disgust is unlikely to affect a person's psychological and emotional health and is likely an adaptive strategy.

Several limitations apply to the present study. First, using the Moral Foundations Questionnaire (MFQ), a measure of a person’s general moral beliefs, may be less useful for this

particular experiment than asking participants to judge a person's morality in specific scenarios, similar to studies by Feinberg et al. (2014) and Inbar et al. (2009a). Similarly, utilising scenarios of moral disgust specifically to induce disgust similar to Feinberg et al. (2014) may be better for the aims of this experiment as the use of multiple domains of disgust may have diluted the effects on morality. The study should perhaps have focused on particular domains of disgust instead of disgust more generally. Rozin et al. (2008) conceptualised nine domains of disgust, of which sexual behaviours and moral offences are two examples that may be more suited to examination of moral judgements. Future studies could select sexual behaviours and moral offences instead of general disgust. Secondly, participants were asked about their moral behaviour in hypothetical situations. Hypotheticals are far removed from real life, and participant answers on the MFQ may be closer to their idealised answers as opposed to reflections of their true moral behaviours (cf. Rogers, 1995). A more suitable design could be to follow Zhong & Liljenquist's (2006) design, conducting an experiment in a lab and observing participants' behaviour and their reactions when their own moral misdeeds have been made salient to them.

In conclusion, the present study examined the relationship between disgust and moral judgements, and whether these judgements are made harsher by childhood trauma, and made less harsh by emotion regulation. The present study found that suppression was better than reappraisal at decreasing disgust, with reappraisal failing to reduce the harshness of moral decision-making. Childhood trauma is associated with lower use of reappraisal but a higher relative use of suppression. The tendency to employ suppression instead of reappraisal may be a risk factor for the development of psychopathology, however it is likely an adaptive emotion regulation strategy in response to acute disgust.

References

- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource?. *Journal of personality and social psychology*, 74(5), 1252.
<https://doi.org/10.1037/0022-3514.74.5.1252>
- Bernstein, D. P., Fink, L., Handelsman, L., & Foote, J. (1998). *Childhood trauma questionnaire. Assessment of family violence: A handbook for researchers and practitioners*.
<https://doi.org/10.1037/t02080-000>
- Chapman, H. A., Kim, D. A., Susskind, J. M., & Anderson, A. K. (2009). In bad taste: Evidence for the oral origins of moral disgust. *Science*, 323(5918), 1222-1226.
<https://doi.org/10.1126/science.1165565>
- Chapman, H. A., & Anderson, A. K. (2013). Things rank and gross in nature: A review and synthesis of moral disgust. *Psychological Bulletin*, 139, 300–327.
<https://doi.org/10.1037/a0030964>
- Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic press.
- Crisp, R. (Ed.). (2014). *Aristotle: Nicomachean Ethics*. Cambridge University Press.
<https://doi.org/10.1017/CBO9780511802058>
- Curtis, V., De Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366(1563), 389-401. <https://doi.org/10.1098/rstb.2010.0117>
- Davidson, R. J., Ekman, P., Saron, C. D., Senulis, J. A., & Friesen, W. V. (1990). Approach-withdrawal and cerebral asymmetry: emotional expression and brain physiology: I. *Journal of personality and social psychology*, 58(2), 330.
<https://psycnet.apa.org/doi/10.1037/0022-3514.58.2.330>

- Dunn, B. D., Billotti, D., Murphy, V., & Dalgleish, T. (2009). The consequences of effortful emotion regulation when processing distressing material: A comparison of suppression and acceptance. *Behavioral Research and Therapy*, 47, 761–773.
<https://doi.org/10.1016/j.brat.2009.05.007>
- de Jong, P. J., van Overveld, M., & Peters, M. L. (2011). Sympathetic and parasympathetic responses to a core disgust video clip as a function of disgust propensity and disgust sensitivity. *Biological psychology*, 88(2-3), 174-179.
<https://doi.org/10.1016/j.biopsycho.2011.07.009>
- Eftekhari, A., Zoellner, L. A., & Vigil, S. A. (2009). Patterns of emotion regulation and psychopathology. *Anxiety, Stress, & Coping*, 22(5), 571-586.
<https://doi.org/10.1080/10615800802179860>
- Eskine, K. J., Kacirik, N. A., & Prinz, J. J. (2011). A bad taste in the mouth: Gustatory disgust influences moral judgment. *Psychological science*, 22(3), 295-299.
<https://doi.org/10.1177/0956797611398497>
- Eysenck, M.W. (2000). A cognitive approach to trait anxiety. *European Journal of Personality*, 14, 463-476.
[https://doi.org/10.1002/1099-0984\(200009/10\)14:5<463::AID-PER393>3.0.CO;2-3](https://doi.org/10.1002/1099-0984(200009/10)14:5<463::AID-PER393>3.0.CO;2-3)
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, 39(2), 175-191. <https://doi.org/10.3758/bf03193146>

- Feinberg, M., Antonenko, O., Willer, R., Horberg, E. J., & John, O. P. (2014). Gut check: Reappraisal of disgust helps explain liberal–conservative differences on issues of purity. *Emotion, 14*(3), 513. <https://doi.org/10.1037/a0033727>
- Fergus, T. A., & Valentiner, D. P. (2009). The Disgust Propensity and Sensitivity Scale–Revised: An examination of a reduced-item version. *Journal of Anxiety Disorders, 23*(5), 703-710. <https://doi.org/10.1016/j.janxdis.2009.02.009>
- Galanakis, M., Stalikas, A., Pezirkianidis, C., & Karakasidou, I. (2016). Reliability and validity of the modified differential emotions scale (mDES) in a Greek sample. *Psychology, 7*(01), 101. <https://doi.org/10.4236/psych.2016.71012>
- Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Spassena, K., & Ditto, P. H. (2008). Moral foundations questionnaire. *Journal of Personality and Social Psychology*. <https://doi.org/10.1037/t05651-000>
- Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of personality and social psychology, 101*(2), 366. <https://doi.org/10.1037/a0021847>
- Gross, J. J. (1998). Antecedent-and response-focused emotion regulation: divergent consequences for experience, expression, and physiology. *Journal of personality and social psychology, 74*(1), 224. <https://doi.org/10.1037//0022-3514.74.1.224>
- Gross, J. J. (2014). *Handbook of Emotion Regulation*, 2nd Edn. New York, NY: Guilford.
- 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*(2), 348. <https://doi.org/10.1037/0022-3514.85.2.348>

- Gross, J. J., & Levenson, R. W. (1995). Emotion elicitation using films. *Cognition & emotion*, 9(1), 87-108. <https://doi.org/10.1080/02699939508408966>
- Haanstra, B. (1958). *Glass*. Ministry of Education, Arts and Sciences
- Haidt, J. (2003). The moral emotions. In R. J. Davidson, K. R. Scherer, & H. H. Goldsmith (Eds.), *Handbook of affective sciences*. Oxford: Oxford University Press.(pp. 852-870).
- Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling. Retrieved from <http://www.afhayes.com/public/process2012.pdf>
- Hodson, G., & Costello, K. (2007). Interpersonal disgust, ideological orientations, and dehumanization as predictors of intergroup attitudes. *Psychological Science*, 18, 691–698. <https://doi.org/10.1111/j.1467-9280.2007.01962.x>
- Hodson, G., Choma, B. L., Boisvert, J., Hafer, C. L., MacInnis, C. C., & Costello, K. (2013). The role of intergroup disgust in predicting negative outgroup evaluations. *Journal of Experimental Social Psychology*, 49(2), 195-205. <https://psycnet.apa.org/doi/10.1016/j.jesp.2012.11.002>
- Horberg, E. J., Oveis, C., Keltner, D., & Cohen, A. B. (2009). Disgust and the moralization of purity. *Journal of personality and social psychology*, 97(6), 963. <https://doi.org/10.1037/a0017423>
- Inbar, Y., Pizarro, D. A., Knobe, J., & Bloom, P. (2009a). Disgust sensitivity predicts intuitive disapproval of gays. *Emotion*, 9(3), 435. <https://doi.org/10.1037/a0015960>

- Inbar, Y., Pizarro, D. A., & Bloom, P. (2009b). Conservatives are more easily disgusted than liberals. *Cognition and Emotion*, *23*, 714–725.
<https://doi.org/10.1080/02699930802110007>
- Jones, A., & Fitness, J. (2008). Moral hypervigilance: The influence of disgust sensitivity in the moral domain. *Emotion*, *8*, 613–627. <https://doi.org/10.1037/a0013435>
- Kant, I. (1996). Critique of pure reason (WS Pluhar, Trans.). *Indianapolis, IN: Hackett. (Original work published 1781).*
- Lee, S. W., Tang, H., Wan, J., Mai, X., & Liu, C. (2015). A cultural look at moral purity: Wiping the face clean. *Frontiers in Psychology*, *6*, 577. <https://doi.org/10.3389/fpsyg.2015.00577>
- Lewis, M. (1993). Self-conscious emotions: Embarrassment, pride, shame, and guilt. In M. Lewis & J. Haviland (Eds.), *Handbook of emotions*. (pp. 563-573). New York: Guilford Press.
- Lundberg, P., Ojala, A., Suominen, K. M., Lilley, T., & Vainio, A. (2021). Disease Avoidance Model Explains the Acceptance of Cohabitation With Bats During the COVID-19 Pandemic. *Frontiers in Psychology*, 2892. <https://doi.org/10.3389/fpsyg.2021.635874>
- Marshall, D. F., Passarotti, A. M., Ryan, K. A., Kamali, M., Saunders, E. F., Pester, B., ... & Langenecker, S. A. (2016). Deficient inhibitory control as an outcome of childhood trauma. *Psychiatry research*, *235*, 7-12. <https://doi.org/10.1016/j.psychres.2015.12.013>
- Matchett, G., & Davey, G. C. (1991). A test of a disease-avoidance model of animal phobias. *Behaviour research and therapy*, *29*(1), 91-94.
[https://doi.org/10.1016/S0005-7967\(09\)80011-9](https://doi.org/10.1016/S0005-7967(09)80011-9)

- Murphy, F., Nasa, A., Cullinane, D., Raajakesary, K., Gazzaz, A., Sooknarine, V., ... & Roddy, D. W. (2022). Childhood trauma, the HPA axis and psychiatric illnesses: a targeted literature synthesis. *Frontiers in Psychiatry, 13*, 748372. <https://doi.org/10.3389/fpsy.2022.748372>
- Oaten, M., Stevenson, R. J., & Case, T. I. (2009). Disgust as a disease-avoidance mechanism. *Psychological bulletin, 135*(2), 303. <https://doi.org/10.1037/a0014823>
- Olatunji, B. O., Berg, H. E., & Zhao, Z. (2017a). Emotion regulation of fear and disgust: differential effects of reappraisal and suppression. *Cognition and Emotion, 31*(2), 403-410. <https://doi.org/10.1080/02699931.2015.1110117>
- Olatunji, B. O., Armstrong, T., & Elwood, L. (2017b). Is disgust proneness associated with anxiety and related disorders? A qualitative review and meta-analysis of group comparison and correlational studies. *Perspectives on Psychological Science, 12*(4), 613-648. <https://doi.org/10.1177/1745691616688879>
- Phillips, M. L., Senior, C., Fahy, T., & David, A. S. (1998). Disgust—the forgotten emotion of psychiatry. *The British Journal of Psychiatry, 172*(5), 373-375. <https://doi.org/10.1192/bjp.172.5.373>
- Richards, J. M., & Gross, J. J. (2000). Emotion regulation and memory: the cognitive costs of keeping one's cool. *Journal of personality and social psychology, 79*(3), 410. <https://doi.org/10.1037/0022-3514.79.3.410>
- Rogers, C. R. (1995). *On becoming a person: A therapist's view of psychotherapy*. Houghton Mifflin Harcourt.
- Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., & Lyon, D. (1989). Evidence for terror management theory: I. The effects of mortality salience on reactions to those who

- violate or uphold cultural values. *Journal of personality and social psychology*, 57(4), 681. <https://doi.org/10.1037/0022-3514.57.4.681>
- Rossi, V., & Pourtois, G. (2012). Transient state-dependent fluctuations in anxiety measured using STAI, POMS, PANAS or VAS: a comparative review. *Anxiety, Stress & Coping*, 25(6), 603-645. <https://doi.org/10.1080/10615806.2011.582948>
- Haidt, J., McCauley, C., & Rozin, P. (1994). Individual differences in sensitivity to disgust: A scale sampling seven domains of disgust elicitors. *Personality and Individual Differences*, 16(5), 701-713. [https://doi.org/10.1016/0191-8869\(94\)90212-7](https://doi.org/10.1016/0191-8869(94)90212-7)
- Rozin, P., Haidt, J., & McCauley, C. R. (2008). *Disgust*.
- Rutter, M., Moffitt, T. E., & Caspi, A. (2006). Gene–environment interplay and psychopathology: Multiple varieties but real effects. *Journal of Child Psychology and Psychiatry*, 47(3-4), 226-261. <https://doi.org/10.1111/j.1469-7610.2005.01557.x>
- Sapolsky, R. M. (2017). *Behave: The biology of humans at our best and worst*. Penguin.
- Scher, C. D., Stein, M. B., Asmundson, G. J., McCreary, D. R., & Forde, D. R. (2001). The childhood trauma questionnaire in a community sample: psychometric properties and normative data. *Journal of Traumatic Stress*, 14(4), 843-857. <https://doi.org/10.1023/A:1013058625719>
- Schnall, S., Haidt, J., Clore, G. L., & Jordan, A. H. (2008). Disgust as embodied moral judgment. *Personality and Social Psychology Bulletin*, 34(8), 1096-1109. <https://doi.org/10.1177/0146167208317771>
- Sheppes, G., & Meiran, N. (2007). Better late than never? On the dynamics of online regulation of sadness using distraction and cognitive reappraisal. *Personality and Social Psychology Bulletin*, 33(11), 1518-1532. <https://doi.org/10.1177/0146167207305537>

- Shin, L.M., Whalen, P.J., Pitman, R.K., Bush, G., Macklin, M.L., Lasko, N.B., Orr, S.P., McInerney, S.C., Rauch, S.L., 2001. An fMRI study of anterior cingulate function in posttraumatic stress disorder. *Biol Psychiatry* 50, 932-942.
[https://doi.org/10.1016/s0006-3223\(01\)01215-x](https://doi.org/10.1016/s0006-3223(01)01215-x)
- Sörman, K., Garke, M. Å., Isacson, N. H., Jangard, S., Bjureberg, J., Hellner, C., ... & Jayaram-Lindström, N. (2022). Measures of emotion regulation: Convergence and psychometric properties of the difficulties in emotion regulation scale and emotion regulation questionnaire. *Journal of Clinical Psychology*, 78(2), 201-217.
<https://doi.org/10.1002/jclp.23206>
- Stevens, J. S., Ely, T. D., Sawamura, T., Guzman, D., Bradley, B., Ressler, K. J., & Jovanovic, T. (2016). Childhood maltreatment predicts reduced inhibition-related activity in the rostral anterior cingulate in PTSD, but not trauma-exposed controls. *Depression and anxiety*, 33(7), 614-622. <https://doi.org/10.1002/da.22506>
- Teicher, M. H., Samson, J. A., Anderson, C. M., & Ohashi, K. (2016). The effects of childhood maltreatment on brain structure, function and connectivity. *Nature reviews neuroscience*, 17(10), 652-666. <https://doi.org/10.1038/nrn.2016.111>
- Van Overveld, W. J. M., De Jong, P. J., Peters, M. L., Cavanagh, K., & Davey, G. C. (2006). Disgust propensity and disgust sensitivity: Separate constructs that are differentially related to specific fears. *Personality and Individual Differences*, 41(7), 1241-1252.
<https://doi.org/10.1016/j.paid.2006.04.021>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of personality and social psychology*, 54(6), 1063. <https://doi.org/10.1037/0022-3514.54.6.1063>

- Webb, T. L., Schweiger Gallo, I., Miles, E., Gollwitzer, P. M., & Sheeran, P. (2012). Effective regulation of affect: An action control perspective on emotion regulation. *European review of social psychology*, 23(1), 143-186.
<https://doi.org/10.1080/10463283.2012.718134>
- Wenzlaff, R. M., & Wegner, D. M. (2000). Thought suppression. *Annual review of psychology*, 51(1), 59-91. <https://doi.org/10.1146/annurev.psych.51.1.59>
- Wooldridge, J. M., Wadud, M., & Lye, J. (2016). *Introductory econometrics: Asia pacific edition with online study tools 12 months*. Cengage AU.
- Zhong, C. B., & Liljenquist, K. (2006). Washing away your sins: Threatened morality and physical cleansing. *Science*, 313(5792), 1451-1452.
<https://doi.org/10.1126/science.1130726>

Appendices
Appendix A

The Disgust Propensity and Sensitivity Scale - Revised (DPSS-R)

Instructions: This questionnaire consists of 12 statements about disgust. Please read each statement and think how often it is true for you, then select the box that is closest to this using the scale below:

- | | | Never | Rarely | Some
times | Often | Always |
|-----|---|-------|--------|---------------|-------|--------|
| 1. | I avoid disgusting things. | | | | | |
| 2. | When I feel disgusted, I worry that I might pass out. | | | | | |
| 3. | It scares me when I feel nauseous. | | | | | |
| 4. | I feel repulsed. | | | | | |
| 5. | Disgusting things make my stomach turn. | | | | | |
| 6. | I screw up my face in disgust. | | | | | |
| 7. | When I notice that I feel nauseous, I worry about vomiting. | | | | | |
| 8. | I experience disgust. | | | | | |
| 9. | It scares me when I feel faint. | | | | | |
| 10. | I find something disgusting. | | | | | |
| 11. | It embarrasses me when I feel disgusted. | | | | | |
| 12. | I think feeling disgust is bad for me. | | | | | |

Appendix B
Positive and Negative Affect Schedule (PANAS-SF)

Instructions: Please indicate the extent you have felt this way over the past week using the scale below:

- | | Very slightly
or not at all | A little | Moderately | Quite a
bit | Extremely |
|-----|--------------------------------|----------|------------|----------------|-----------|
| 1. | Interested | | | | |
| 2. | Distressed | | | | |
| 3. | Excited | | | | |
| 4. | Upset | | | | |
| 5. | Strong | | | | |
| 6. | Guilty | | | | |
| 7. | Scared | | | | |
| 8. | Hostile | | | | |
| 9. | Enthusiastic | | | | |
| 10. | Proud | | | | |
| 11. | Irritable | | | | |
| 12. | Alert | | | | |
| 13. | Ashamed | | | | |
| 14. | Inspired | | | | |
| 15. | Nervous | | | | |
| 16. | Determined | | | | |
| 17. | Attentive | | | | |
| 18. | Jittery | | | | |
| 19. | Active | | | | |
| 20. | Afraid | | | | |

Appendix C

Emotion Regulation Questionnaire (ERQ)

Description of Measure:

A 10-item scale designed to measure respondents' tendency to regulate their emotions in two ways: (1) Cognitive Reappraisal and (2) Expressive Suppression. Respondents answer each item on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Instructions:

We would like to ask you some questions about your emotional life, in particular, how you control (i.e. *regulate and manage*) your emotions. 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 answer using the scale below:

1.	2.	3.	4.	5.	6.	7.
Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat Agree	Agree	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'm 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.

Appendix D

Child Trauma Questionnaire (CTQ) - Short Form

Instructions:

These questions ask about some of your experiences **growing up as a child and a teenager**. For each question, select the box that best describes how you feel using the scale below. Although some of these questions are of a personal nature, please try to answer as honestly as you can. Your answers will be kept confidential.

Q	Question	Never True	Rarely True	Sometimes True	Often True	Very Often True
---	----------	---------------	----------------	-------------------	---------------	-----------------------

When I was growing up

1. I didn't have enough to eat
2. I knew that there was someone to take care of me and protect me.
3. People in my family called me things like "stupid", "lazy", or "ugly".
4. My parents were too drunk or high to take care of the family.
5. There was someone in my family who helped me feel important or special

When I was growing up

6. I had to wear dirty clothes
7. I felt loved.

8. I thought that my parents wished I had never been born
9. I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.
10. There was nothing I wanted to change about my family.
11. People in my family hit me so hard that it left me with bruises or marks.
12. I was punished with a belt, a board, a cord (or some other hard object).
13. People in my family looked out for each other.
14. People in my family said hurtful or insulting things to me.
15. I believe that I was physically abused.

When I was growing up

16. I had the perfect childhood.
17. I got hit or beaten so badly that it was noticed by someone like a teacher, neighbour, or doctor.
18. Someone in my family hated me.

19. People in my family felt close to each other.
20. Someone tried to touch me in a sexual way or tried to make me touch them.

When I was growing up

21. Someone threatened to hurt me or tell lies about me unless I did something sexual with them.
22. I had the best family in the world
23. Someone tried to make me do sexual things or watch sexual things.
24. Someone molested me (took advantage of me sexually).
25. I believe that I was emotionally abused.

When I was growing up

26. There was someone to take me to the doctor if I needed it
27. I believe that I was sexually abused.
28. My family was a source of strength and support.

Appendix E

Modified Differential Emotions Scale (mDES)

Instructions:

Please think back to how you felt during the video, and rate how often you experienced the following emotions using the scale below

	Not at all	Hardly	Some of the time	Often	Most of the time
Amused, fun-loving, silly					
Angry, irritated, annoyed					
Scared, fearful, afraid					
Disgust, distaste, revulsion					
Embarrassed, self-conscious, blushing					
Glad, happy, joyful					
Sad, downhearted, unhappy					
Stressed, nervous, overwhelmed					
Grateful, appreciative, thankful					
Interested, alert, curious					

Appendix F

Emotion Regulation Response Scale (ERRS)

A self-report Emotion Regulation Response Scale (ERRS) [adapted from Dunn, Billotti, Murphy, & Dalgleish (2009) and Olatunji et al. (2017a)] included four items used to assess participants' regulation strategies during the videos on a scale of 0 "not at all" to 100 "extremely". The questions were as follows:

- (1) How much did you find yourself trying to suppress your emotional response to the video?
- (2) How much did you find yourself trying to change the meaning of the video while you watched it?
- (3) How much did you find yourself not looking at the video?
- (4) How much did you find yourself deliberately thinking about other things while watching the video?

Appendix G

Moral Foundations Questionnaire (MFQ)

Instructions:

When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking? Please rate each statement using the scale below:

[0] = not at all relevant (This consideration has nothing to do with my judgments of right and wrong)

[1] = not very relevant

[2] = slightly relevant

[3] = somewhat relevant

[4] = very relevant

[5] = extremely relevant (This is one of the most important factors when I judge right and wrong)

- | | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1. Whether or not someone suffered emotionally | | | | | | |
| 2. Whether or not some people were treated differently than others | | | | | | |
| 3. Whether or not someone's action showed love for his or her country | | | | | | |
| 4. Whether or not someone showed a lack of respect for authority | | | | | | |
| 5. Whether or not someone violated standards of purity and decency | | | | | | |
| 6. Whether or not someone was good at math | | | | | | |
| 7. Whether or not someone cared for someone weak or vulnerable | | | | | | |

8. Whether or not someone acted unfairly
9. Whether or not someone did something to betray his or her group
10. Whether or not someone conformed to the traditions of society
11. Whether or not someone did something disgusting
12. Whether or not someone was cruel
13. Whether or not someone was denied his or her rights
14. Whether or not someone showed a lack of loyalty
15. Whether or not an action caused chaos or disorder
16. Whether or not someone acted in a way that God would approve of

Instructions:

Please read the following sentences and indicate your agreement or disagreement using the scale below:

[0] = Strongly disagree

[1] = Moderately disagree

[2] = Slightly disagree

[3] = Slightly agree

[4] = Moderately agree

[5] = Strongly agree

- | | Strongly disagree | Moderately disagree | Slightly disagree | Slightly agree | Moderately agree | Strongly agree |
|-----|--|---------------------|-------------------|----------------|------------------|----------------|
| 17. | Compassion for those who are suffering is the most crucial virtue. | | | | | |
| 18. | When the government makes laws, the number one principle should be ensuring that everyone is treated fairly. | | | | | |
| 19. | I am proud of my country's history. | | | | | |
| 20. | Respect for authority is something all children need to learn. | | | | | |
| 21. | People should not do things that are disgusting, even if no one is harmed. | | | | | |
| 22. | It is better to do good than to do bad. | | | | | |
| 23. | One of the worst things a person could do is hurt a defenseless animal. | | | | | |

24. Justice is the most important requirement for a society.
25. People should be loyal to their family members, even when they have done something wrong.
26. Men and women each have different roles to play in society.
27. I would call some acts wrong on the grounds that they are unnatural.
28. It can never be right to kill a human being.
29. I think it's morally wrong that rich children inherit a lot of money while poor children inherit nothing.
30. It is more important to be a team player than to express

oneself.

31. If I were a soldier and disagreed with my commanding officer's orders, I would obey anyway because that is my duty.
32. Chastity is an important and valuable virtue.

Appendix H

Emotion Regulation Instructions by Condition

The Disgust Reappraisal instructions were as follows:

We will now show you a short video clip. In this video clip, several young individuals are participating in an egg-eating and milk-drinking contest and start vomiting. It is important that you watch the video clip carefully, but if you find the video too distressing, just skip to the end of the video. Please try to adopt a detached and unemotional attitude as you watch the video. In other words, as you watch the video clip, try to think about what you are seeing objectively, in terms of the technical aspects of the events you observe. Watch the video clip carefully, but please try to think about what you are seeing in such a way that you don't feel anything at all. Please pay close attention to the video clip.

The Disgust Suppression instructions were as follows:

We will now be showing you a short video clip. In this video clip, several young individuals are participating in an egg-eating and milk-drinking contest and start vomiting. It is important that you watch the video clip carefully, but if you find the video too distressing, just skip to the end of the video. If you have any feelings as you watch the video clip, please try your best not to let those feelings show. In other words, as you watch the video clip, try to behave in such a way that a person watching you would not know you were feeling anything. Watch the video clip carefully, and remember to behave in a way that nobody watching you would know how you are feeling.

The Disgust No Emotion Regulation instructions were as follows:

We will now be showing you a short video clip. In this video clip, several young individuals are participating in an egg-eating and milk-drinking contest and start vomiting. It is important that you watch the video clip carefully, but if you find the video too distressing, just skip to the end of the video. Please pay close attention to the video clip.

The Control Reappraisal instructions were as follows:

We will now be showing you a short video clip. In this video clip, several individuals are blowing glass in a workshop. It is important that you watch the video clip carefully, but if you find the video too distressing, just skip to the end of the video. Please try to adopt a detached and unemotional attitude as you watch the video. In other words, as you watch the video clip, try to think about what you are seeing objectively, in terms of the technical aspects of the events you observe. Watch the video clip carefully, but please try to think about what you are seeing in such a way that you don't feel anything at all. Please pay close attention to the video clip.

The Control Suppression instructions were as follows:

We will now be showing you a short video clip. In this video clip, several individuals are blowing glass in a workshop. It is important that you watch the video clip carefully, but if you find the video too distressing, just skip to the end of the video. If you have any feelings as you watch the video clip, please try your best not to let those feelings show. In other words, as you watch the video clip, try to behave in such a way that a person watching you would not know you were feeling anything. Watch the video clip carefully, and remember to behave in a way that nobody watching you would know how you are feeling.

The Control No Emotion Regulation instructions were as follows:

We will now be showing you a short video clip. In this video clip, several individuals are blowing glass in a workshop. It is important that you watch the video clip carefully, but if you find the video too distressing, just skip to the end of the video. Please pay close attention to the video clip.

Appendix I

Links to videos used in the interventions, adapted from De Jong et al. (2011)

Disgust Clip:

Edited excerpts from MTV's Jackass (2000) containing an egg-eating contest and a milk-drinking contest, during which participants vomit excessively

https://vimeo.com/796744573?embedded=true&source=vimeo_logo&owner=133908452

Neutral Clip:

A short clip taken from a documentary by Bert Haanstra (1958) on the making of glass

https://www.youtube.com/watch?v=UTMhR_TGftQ&ab_channel=AnthonyO%27Keeffe

Appendix J

Means and standard deviations for all surveys by condition

Scale & Survey Reliability	Disgust			Control		
	Reappraise	Suppress	No Emotion Regulation	Reappraise	Suppress	No Emotion Regulation
DPSS-P Disgust Propensity ($\alpha = 0.76$)	$M = 17.86$ $SD = 3.03$	$M = 16.65$ $SD = 4.19$	$M = 18.02$ $SD = 3.47$	$M = 18.72$ $SD = 4.08$	$M = 18.74$ $SD = 3.96$	$M = 16.33$ $SD = 4.32$
DPSS-S Disgust Sensitivity ($\alpha = 0.82$)	$M = 15.21$ $SD = 4.25$	$M = 14.39$ $SD = 4.92$	$M = 15.44$ $SD = 5.24$	$M = 18.52$ $SD = 4.47$	$M = 18.81$ $SD = 3.80$	$M = 14.07$ $SD = 5.02$
DPSS-R Total ($\alpha = 0.87$)						
PANAS Positive Affect ($\alpha = 0.80$)	$M = 30.02$ $SD = 5.78$	$M = 28.46$ $SD = 5.85$	$M = 31.55$ $SD = 6.39$	$M = 30.75$ $SD = 5.90$	$M = 31.03$ $SD = 5.59$	$M = 31.5$ $SD = 7.04$
PANAS Negative Affect ($\alpha = 0.89$)	$M = 23.11$ $SD = 7.39$	$M = 23.28$ $SD = 8.66$	$M = 23.89$ $SD = 7.58$	$M = 28.98$ $SD = 6.56$	$M = 29.30$ $SD = 6.25$	$M = 22.43$ $SD = 8.59$
PANAS Total ($\alpha = 0.85$)						
ERQ: Cognitive Reappraise ($\alpha = 0.82$)	$M = 29.45$ $SD = 5.08$	$M = 27.74$ $SD = 6.61$	$M = 27.93$ $SD = 6.79$	$M = 26.72$ $SD = 5.66$	$M = 26.24$ $SD = 5.72$	$M = 28.38$ $SD = 6.80$
ERQ: Expressive Suppress ($\alpha = 0.73$)	$M = 16.52$ $SD = 5.19$	$M = 15.65$ $SD = 5.30$	$M = 15.98$ $SD = 4.60$	$M = 17.31$ $SD = 3.82$	$M = 16.89$ $SD = 3.97$	$M = 15.64$ $SD = 5.48$
ERQ Total ($\alpha = 0.84$)						

Scale & Survey Reliability	Disgust			Control		
	Reappraise	Suppress	No Emotion Regulation	Reappraise	Suppress	No Emotion Regulation
CTQ Emotional Abuse ($\alpha = 0.86$)	$M = 9.25$ $SD = 3.75$	$M = 10.44$ $SD = 4.68$	$M = 9.51$ $SD = 4.40$	$M = 13.57$ $SD = 4.37$	$M = 13.63$ $SD = 4.32$	$M = 9.95$ $SD = 5.10$
CTQ Physical Abuse ($\alpha = 0.90$)	$M = 8.25$ $SD = 4.39$	$M = 9.20$ $SD = 4.58$	$M = 8.60$ $SD = 4.56$	$M = 13.00$ $SD = 4.54$	$M = 13.61$ $SD = 4.57$	$M = 8.22$ $SD = 4.46$
CTQ Sexual Abuse ($\alpha = 0.92$)	$M = 7.18$ $SD = 4.12$	$M = 8.04$ $SD = 4.62$	$M = 8.27$ $SD = 4.89$	$M = 12.96$ $SD = 4.51$	$M = 13.63$ $SD = 4.65$	$M = 7.86$ $SD = 4.63$
CTQ Emotional Neglect ($\alpha = 0.84$)	$M = 10.70$ $SD = 3.97$	$M = 11.30$ $SD = 4.53$	$M = 11.27$ $SD = 4.58$	$M = 13.20$ $SD = 3.62$	$M = 13.50$ $SD = 3.76$	$M = 11.95$ $SD = 5.53$
CTQ Physical Neglect ($\alpha = 0.75$)	$M = 9.14$ $SD = 3.88$	$M = 9.43$ $SD = 4.19$	$M = 9.24$ $SD = 3.89$	$M = 13.58$ $SD = 3.03$	$M = 14.06$ $SD = 2.96$	$M = 8.88$ $SD = 3.70$
CTQ Minimis./ Denial ($\alpha = 0.29$)	$M = 9.41$ $SD = 1.76$	$M = 9.72$ $SD = 2.05$	$M = 9.76$ $SD = 1.67$	$M = 9.38$ $SD = 1.58$	$M = 9.25$ $SD = 1.74$	$M = 9.66$ $SD = 1.97$
CTQ Total ($\alpha = 0.93$)	$(\alpha = 0.93)$					
mDES Positive Emotions ($\alpha = 0.77$)	$M = 8.57$ $SD = 3.67$	$M = 9.44$ $SD = 3.86$	$M = 8.87$ $SD = 4.16$	$M = 12.48$ $SD = 2.75$	$M = 12.15$ $SD = 2.87$	$M = 12.09$ $SD = 3.78$
mDES Negative Emotions ($\alpha = 0.84$)	$M = 14.36$ $SD = 4.91$	$M = 13.65$ $SD = 5.46$	$M = 15.78$ $SD = 5.50$	$M = 16.23$ $SD = 4.26$	$M = 16.67$ $SD = 4.48$	$M = 10.93$ $SD = 5.55$
mDES Total	$(\alpha = 0.81)$					

Scale & Survey Reliability	Disgust			Control		
	Reappraise	Suppress	No Emotion Regulation	Reappraise	Suppress	No Emotion Regulation
ERRS1: Suppress	<i>M</i> = 44.77 <i>SD</i> = 25.91	<i>M</i> = 49.37 <i>SD</i> = 31.56	<i>M</i> = 51.38 <i>SD</i> = 29.13	<i>M</i> = 50.02 <i>SD</i> = 20.39	<i>M</i> = 50.06 <i>SD</i> = 21.29	<i>M</i> = 35.27 <i>SD</i> = 27.33
ERRS2: Change Meaning	<i>M</i> = 42.54 <i>SD</i> = 27.41	<i>M</i> = 37.51 <i>SD</i> = 29.27	<i>M</i> = 43.43 <i>SD</i> = 26.95	<i>M</i> = 46.74 <i>SD</i> = 21.51	<i>M</i> = 46.10 <i>SD</i> = 20.97	<i>M</i> = 39.91 <i>SD</i> = 30.33
ERRS3: Not Looking	<i>M</i> = 48.87 <i>SD</i> = 29.60	<i>M</i> = 42.37 <i>SD</i> = 34.18	<i>M</i> = 50.98 <i>SD</i> = 30.41	<i>M</i> = 45.22 <i>SD</i> = 22.45	<i>M</i> = 46.52 <i>SD</i> = 22.09	<i>M</i> = 33.63 <i>SD</i> = 29.78
ERRS4: Think of other things	<i>M</i> = 46.63 <i>SD</i> = 27.84	<i>M</i> = 41.67 <i>SD</i> = 36.11	<i>M</i> = 46.33 <i>SD</i> = 29.15	<i>M</i> = 48.04 <i>SD</i> = 23.39	<i>M</i> = 49.93 <i>SD</i> = 22.64	<i>M</i> = 38.02 <i>SD</i> = 28.53
ERRS Total	<i>(α = 0.81)</i>					
MFQ: Harm/ Care <i>(α = 0.71)</i>	<i>M</i> = 26.38 <i>SD</i> = 4.18	<i>M</i> = 26.37 <i>SD</i> = 6.01	<i>M</i> = 25.78 <i>SD</i> = 5.47	<i>M</i> = 21.90 <i>SD</i> = 4.25	<i>M</i> = 22.10 <i>SD</i> = 4.36	<i>M</i> = 25.12 <i>SD</i> = 5.85
MFQ: Fairness/ Recip. <i>(α = 0.69)</i>	<i>M</i> = 25.96 <i>SD</i> = 3.66	<i>M</i> = 25.56 <i>SD</i> = 5.31	<i>M</i> = 26.15 <i>SD</i> = 4.70	<i>M</i> = 21.71 <i>SD</i> = 4.03	<i>M</i> = 21.65 <i>SD</i> = 4.27	<i>M</i> = 25.50 <i>SD</i> = 4.42
MFQ: In-Group Loyalty <i>(α = 0.63)</i>	<i>M</i> = 22.23 <i>SD</i> = 4.54	<i>M</i> = 21.48 <i>SD</i> = 4.95	<i>M</i> = 21.62 <i>SD</i> = 4.58	<i>M</i> = 21.87 <i>SD</i> = 4.39	<i>M</i> = 21.73 <i>SD</i> = 4.16	<i>M</i> = 21.78 <i>SD</i> = 6.02
MFQ: Authority/ Respect <i>(α = 0.64)</i>	<i>M</i> = 22.29 <i>SD</i> = 4.84	<i>M</i> = 21.81 <i>SD</i> = 5.81	<i>M</i> = 21.47 <i>SD</i> = 5.12	<i>M</i> = 22.0 <i>SD</i> = 4.0	<i>M</i> = 21.81 <i>SD</i> = 4.20	<i>M</i> = 22.02 <i>SD</i> = 5.51

Scale & Survey Reliability	Disgust			Control		
	Reappraise	Suppress	No Emotion Regulation	Reappraise	Suppress	No Emotion Regulation
MFQ: Purity/ Sanctity ($\alpha = 0.68$)	$M = 21.16$ $SD = 5.58$	$M = 20.48$ $SD = 6.56$	$M = 19.49$ $SD = 5.55$	$M = 22.20$ $SD = 3.92$	$M = 22.43$ $SD = 4.38$	$M = 20.81$ $SD = 5.82$
MFQ: Unrelated ($\alpha = -0.81$)	$M = 7.43$ $SD = 1.26$	$M = 7.39$ $SD = 1.39$	$M = 7.11$ $SD = 1.17$	$M = 7.47$ $SD = 1.89$	$M = 7.46$ $SD = 1.74$	$M = 7.36$ $SD = 1.43$
MFQ Total ($\alpha = 0.87$)						
Valid N	56	54	55	194	200	58

Appendix K

Confirmation of scores on Disgust Propensity and Sensitivity Scale - Revised (DPSS-R) significantly predicting scores on the Moral Foundations Questionnaire (MFQ)

Two simple linear regressions were used to test if higher scores on the DPSS-R significantly predicted higher scores on the Moral Foundations Questionnaire (MFQ). For Disgust Propensity, the overall regression was statistically significant ($R^2 = 0.081$, $F(1, 613) = 53.78$, $p < 0.01$), showing that higher scores on the Disgust Propensity Subscale did significantly predict higher scores on the MFQ ($\beta = 1.29$, $p < 0.01$). For Disgust Sensitivity, the overall regression was statistically significant ($R^2 = 0.05$, $F(1, 613) = 29.36$, $p < 0.01$), showing that higher scores on the Disgust Sensitivity Subscale did significantly predict higher scores on the MFQ ($\beta = 0.81$, $p < 0.01$). When analysing the subscales of the MFQ, Disgust Sensitivity was the strongest predictor of scores on any one scale; the Purity/Sanctity subscale. The overall regression was statistically significant ($R^2 = 0.17$, $F(1, 612) = 125.04$, $p < 0.01$), showing that higher scores on the Disgust Sensitivity Subscale did significantly predict higher scores on the Purity/Sanctity subscale ($\beta = 0.42$, $p < 0.01$). Disgust sensitivity was the strongest positive predictor of scores on the Purity/Sanctity subscale of the MFQ, supporting the findings that disgust sensitivity is positively associated with increased moral hypervigilance (Jones & Fitness, 2008) and social conservatism (Inbar et al., 2009a). Disgust propensity and sensitivity both had a positive association with higher scores on each subscale of the MFQ, supporting Inbar et al.'s (2009b) findings that disgust sensitivity and propensity are associated with conservative attitudes towards abortion and same-sex marriage.