

Can Induced Awe Reduce Anti-Gay Prejudice in Heterosexual Adults and Does the Need for Closure Moderate this Effect?

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With sexual prejudice continuing to be widely prevalent and seriously harmful, there is a need to find ways to reduce anti-gay prejudice (AGP). This online experimental study examined if a novel intervention, induced awe, can reduce AGP; if those high in need for closure (NFC) show higher AGP; and if NFC moderates the effect of awe on AGP. In total, 154 heterosexual adults completed the Need for Closure Scale (Roets & Van Hiel, 2011) before being randomly assigned to one of three emotion induction interventions – 1) watching a 4.43 min long video of the target emotion, awe, 2) watching the comparison emotion, amusement, or 3) watching a neutral emotion as a control. Post intervention, the participants completed the explicit measures Homosexuality Attitudes Scale (HAS; Kite & Deaux, 1986). Data were analysed using a 2 (NFC) x 3 (emotion type) independent factorial ANOVA. None of the three hypotheses were supported since there were no main effects of awe or NFC on AGP, and no interaction effect of awe and NFC on AGP. Key implications of these results were 1) awe induction does not change prejudicial attitudes at an explicit level (Dale et al., 2020), 2) factors beyond NFC, like Right Wing Authoritarianism (RWA) and Social Dominance Orientation (SDO), may influence the effectiveness of awe in reducing prejudice, and 3) questions were raised about certain boundaries for awe's effectiveness. Methodological modifications suggested for future research include using implicit measures or veiled elicitation methods for authentic measurement of AGP, employing more potent awe elicitors, and assessing the mediating role of RWA and SDO on the effect of NFC on AGP.

Keywords: anti-gay prejudice, induced awe, need for closure, Need for Closure Scale, Homosexuality Attitudes Scale, sexual prejudice

Despite decades of struggle, prejudice based on sexual orientation continues to be commonplace (Bartos et al., 2014; Pirlott & Cook, 2018). Homosexual people face rejection at three levels– the socio-political level (heterosexism), the cultural level (sexual stigma) and the individual level (anti-gay prejudice (AGP) or sexual prejudice; Herek, 2007). On a socio-political level, as of December 2020, 70 countries worldwide still criminalised homosexuality and in 11 of those countries, homosexual behaviour could warrant a death penalty (International Lesbian, Gay, Bisexual, Trans, and Intersex Association, 2020). On a cultural level, a major contributor to stigmatization of homosexuality has been the 'scientific' rationalization given by the Psychology and Psychiatry disciplines for treating homosexuality as a mental disorder (Drescher, 2015). The American Psychiatric Association (1987) completely removed homosexuality as a mental disorder as late as 1987, in its revised third edition of the Diagnostic and Statistical Manual of Mental Disorders, and the World Health Organisation (1990) removed homosexuality from its International Classification of Diseases in 1990. On an interpersonal level, homosexuals continue to battle various forms of harmful prejudicial behaviors like verbal harassment, physical assault, sexual assault, social avoidance, and social distancing (Huebner et al., 2004). Sexual prejudice was the cause for 17% of hate crimes commit-

ted in 2019 in the United States (Federal Bureau of Investigation, 2019). Despite the ethical obligation that the discipline of Psychology has, to find effective ways of reducing sexual prejudice, this field of research continues to be very small (Case & Stewart, 2010).

Interventions to Reduce Anti-gay Prejudice

According to a meta-analytic review of interventions to reduce sexual prejudice (Bartos et al., 2014), only education and contact with gay people have shown a reasonable medium sized effect. Education is a rational confrontational intervention that can sometimes work and sometimes backfire (Cramwinckel et al., 2021) because prejudice has underlying emotions that are often resistant to rational argument (Dovidio et al., 2004) and those who identify strongly with their ingroup are likely to feel that their ingroup is being made to look guilty with the educational intervention and to respond with increased hostility towards the outgroup (Doosje et al., 1998). The general findings of intergroup contact research are more promising (Pettigrew & Tropp, 2000; 2008). However, many psychologists (e.g., McKeown & Dixon, 2017; Vezzali & Stathi, 2020) caution against its real-world applicability because the idealized interactions that psychologists study are very different from actual interactions in real-life settings (Paluck & Green, 2009). Other limitations of intergroup contact interventions are: 1) the effects of contact vary significantly across dif-

ferent types of contact - positive or negative (Vezzali & Stathi, 2020); 2) such effects lack generalizability, since most studies have been done with people under the age of 25 and the effects of contact are not measured for longer than a day (Paluck and Green, 2009); and, 3) the model hopes to psychologically rehabilitate dominant bigots (McKeown & Dixon, 2017).

Allport's (1954) intergroup contact hypothesis, said that four conditions must be met for intergroup contact to effectively reduce prejudice: equal status, common goals, intergroup cooperation and support of authorities, and laws and customs. While many subsequent studies have shown that even when all four of the conditions are not met there is still a reduction in prejudice seen (Pettigrew & Tropp, 2000), many critics have shown that in real life, intergroup contact can increase prejudice instead of decreasing it (McKeown & Dixon, 2017; Graf et al., 2014). Another less researched prejudice reducing intervention is elicitation of emotions like empathy toward a discriminated group (Paluck & Green, 2009). However, its effect on reducing sexual prejudicial attitudes has only shown modest results (Bartos et al., 2014). There is a need for psychologists to test other forms of interventions for reducing AGP.

Awe

Awe is an emotional response to exceptionally vast stimuli and events, like the beauty and vastness of nature, certain forms of art, ability, perfection, and supernatural events, that defies one's accustomed frame of reference in some domain, transcends one's current understanding (Shiota et al., 2007), and requires an accommodation/adjustment to existing mental structures (Keltner & Haidt, 2003). Awe is a unique emotion that has shown widespread effects on increasing an individual's prosocial behavior (Piff et al., 2015), as well as on reducing conviction about one's ideological attitudes (Stancato & Keltner, 2021). Experience of positive awe has two kinds of effects. One type is where awe changes the patterns of sociality with reduced focus on self and increased feeling of being small or insignificant (Bai et al., 2017; Stellar et al., 2018), thereby leading us to see ourselves as a small part of a greater whole, more connected to humanity, including out-group members (Shiota et al., 2007).

The second type of effect of awe relates to how its experience is cognitively destabilizing and triggers the need for accommodation (Rudd et al. 2012; Valdesolo et al., 2016). Experiencing awe-inspiring

phenomena involves challenging one's current mental structures (Keltner & Haidt, 2003), and searching for new knowledge structures to make sense of new experiences, leading to schema change (Shiota et al., 2007). Although Dale et al. (2020) did not find support for a schema change with regard to negative racial attitudes toward African Americans, Stancato and Keltner (2021), across three experimental studies, did find robust support for it as a result of experiencing induced awe. Stancato and Keltner (2021) tested the effects of experimentally induced awe on reducing conviction about one's ideological attitudes related to racism and found that induced awe led to uncertainty and ambivalence regarding one's attitudes towards ideologically opponent outgroups and that in turn promoted reduced dogmatism and increased perceptions of social cohesion. There are many theoretical positions (for example Allport, 1954; Adorno et al., 1950; Sidanius et al., 2004), that suggest that many kinds of prejudice, like racism, sexism, and sexual prejudice, share similar characteristics (Aosved et al., 2009). So, theoretically if inducing awe can reduce racially prejudicial attitudes, it should be effective in reducing sexually prejudicial attitudes as well. However, no one has tested this effect yet. This study's first objective was to test the effect of inducing awe on the reduction of AGP in heterosexual adults.

Need for Closure

In his seminal work 'The Nature of Prejudice', Allport (1954) theorized that individuals with a prejudice-prone personality think of anything and everything in a prejudicial way. They have a motivated general way of thinking, that does not discriminate between different outgroups and holds prejudice against all kinds of targeted groups. A more contemporary theory that also supports Allport's (1954) theory of prejudiced personality is the need for closure (NFC) theory posited by Kruglanski and Webster (1996; also see Kruglanski & Fishman, 2009) which explains the individual differences behind prejudicial thinking. Therefore, NFC is a cognitive style that predicts prejudicial attitudes (Onraet et al., 2011; Roets & Van Hiel, 2011).

NFC has been defined as the desire for "an answer on a given topic, any answer, compared to confusion and ambiguity" (Webster & Kruglanski, 1994, p. 1049) with two underlying tendencies - seizing (seeking quick and definite answers sourced through easily accessible information) and freezing (freezing upon those

answers and guarding them against any contradictory information). Individuals high in dispositional NFC desire order and structure in their lives, predictable knowledge that is stable across circumstances, and swift and firm decisions. They are uncomfortable with ambiguity and are closed-minded, unwilling to have their knowledge challenged (Webster & Kruglanski, 1994).

NFC theory explains why people with high dispositional NFC experience discomfort with situations and people that seem to deviate from expectations and norms, and therefore hold negative attitudes toward a wide variety of marginalized groups (Roets & Van Hiel, 2011), including homosexuals (Soenens et al., 2005). In three Belgian studies, Van Hiel et al. (2004) found support for a structural equation model in which NFC had a positive effect on racism which was fully mediated by Right Wing Authoritarianism (RWA) but only partially by Social Dominance Orientation (SDO). Similarly, Baldner and Pierro (2019) found a significant positive correlation between NFC and prejudice against immigrants in Italy and in the United States. Soenens et al. (2005) conducted a study in Belgium with 393 psychology students, examining the relationship between different identity styles and measures of conservatism, and racial and sexual prejudice. As a part of that study, they found that NFC positively correlated with other measures of conservatism (RWA and SDO) and prejudice (racism and anti-gay prejudice). The second objective of this study was to find support for the idea that individuals high in NFC display higher AGP.

Moderating Role of NFC on the Effect of Awe on Anti-gay Prejudice

While Allport (1954) posited that prejudice reducing interventions, like intergroup contact, don't work on prejudice-prone personalities because of the rigidity of their attitudes, contemporary researchers (Dhont et al., 2011; Hodson, 2008) found evidence to the contrary. Dhont et al. (2011) conducted a series of five studies among Flemish Belgian students and adults testing if NFC moderates the relation between intergroup contact and prejudice toward Muslim immigrants. The results consistently showed that intergroup contact was more strongly associated with reduced levels of racial prejudice among people high in NFC compared to people low in NFC. Aosved et al. (2009) found strong correlation between the constructs of racism, sexual prejudice, sexism, ageism, classism, and religious intolerance,

lending credence to the idea that NFC's effects on racial prejudice and sexual prejudice would be similar.

One evolutionary function of awe is to generate a need for accommodation and updating of current mental frameworks, and to make sense of new information that cannot be assimilated in current mental structures (Griskevicius et al., 2010) – needs people are generally motivated to satisfy (Fiedler, 2001). The other function of awe is to increase the prosocial tendencies in people via a sense of 'small self' - seeing oneself as less important in the grand scheme of things (Piff et al., 2015). When faced with situations and people that defy conventions and norms, like homosexuals, people with high NFC (vs. low NFC) have a greater and more urgent need for cognitive accommodation (Dhont et al., 2011; Van Hiel & Mervielde, 2002). Since awe is known to increase prosocial tendencies, we expected the experience of awe to help resolve this heightened need for accommodation in favour of reduced anti-gay bias. Although dispositional tendencies to experience awe are negatively associated with NFC (Shiota et al., 2007), awe can be induced in individuals who are or aren't predisposed to experiencing it, and its effects can last up to a week or longer after the experience (Anderson et al., 2018; Takano & Nomura, 2020).

By combining findings from the awe, NFC, and sexual prejudice literatures, we expected that NFC would play a moderating role in the effect of awe on AGP, in such a way that people high in NFC would respond to experience of awe with a greater reduction in AGP. To overcome prior study limitations of most studies being correlational, conducted in the United States and among college students, this study was designed to be experimental, conducted among heterosexual adults in the age range of 18 to 87 years, with participants from many countries (including the United Kingdom, Canada, United States, Europe, and India). This study's aim was to explore a new line of research related to the use of a novel emotional stimulus, awe, to reduce AGP, especially among high NFC/prejudice-prone people, which has not been conducted to date.

Hypotheses

H1: People who have awe elicited within them will report a larger decrease in anti-gay prejudice than people who experience amusement or neutral emotion.

H2: People high in need for closure will show higher anti-gay prejudice than people low in

need for closure.

H3: There will be an interactive effect of induced emotion and need for closure on anti-gay prejudice, such that the relatively beneficial effects of awe induction (relative to amusement and neutral emotion induction) on anti-gay prejudice should be greater for those high in need for closure than those low in need for closure.

Method

Design

This was an online experimental study with data collected via Qualtrics. This experimental study had an independent measures 2 x 3 factorial design. IV1 'emotion type' was a three level, between-subjects factor where awe, amusement, and neutral emotion types were induced by using three different 4.43-minute-long video stimuli. IV2 'NFC' was a measured factor, split at the time of analysis into two levels – high NFC (above median) and low NFC (below median). The DV was the anti-gay prejudice score. Overall, we aimed to examine 1) the effects of a 4.43 min. awe video (vs. 4.43 min. 'amusement video' – a comparison positive emotion, and a 4.43 min. 'neutral emotion' video – as control) on AGP, 2) the effect of NFC on AGP, 3) the interaction effect of induced emotion type and NFC on AGP.

Participants

The G*Power estimate for the number of participants required for this study was 158 (Power 0.8, effect size 0.25, Alpha error probability 0.05). A total of 159 self-identified heterosexual adults were recruited for this online study – 90 (57%) through Survey Circle (a research participant recruitment website), 57 (36%) through social media platforms (Facebook, LinkedIn, and WhatsApp groups of family and friends), and 12 (7%) through the Research Participation Scheme (RPS) and the MSc. Psychology student community at University of Derby. Participants recruited through Survey Circle and RPS received points for participating in this study, which counted towards their research credit. No other participants received any incentives. Individuals who were not fluent in English, were <18 years of age, or did not self-identify as heterosexual were excluded from this study. Five outlier cases, with z-scores higher than +/- 2.58, were removed from the analysis to improve the conditions of normality in the data set. Remaining participants ($n = 154$) ranged in

age from 18 to 87 ($M = 35$, $SD = 14.5$) and 71% were female and 29% were male. The participant data had a strong skew towards younger age groups with modal age of 23 years and 50% of respondents being under 30 years of age. The sample was geographically heterogeneous, having 50 (32.5%) respondents from the United Kingdom, 42 (27.3%) from India, 21 (13.6%) from Canada, 16 (10.4%) from Europe, 13 (8.4%) from the United States, and 12 (7.8%) from other countries.

Materials

The materials used in this study were a Qualtrics account to host the survey, SPSS to conduct the planned analysis and Student OneDrive to store the participant data. The experiment stimuli used were three previously validated videos, all related to nature, and all edited to the same duration of 4.43 min. Awe video stimulus https://www.youtube.com/watch?v=RUp_P2g8sAc previously used by Piff et al. (2015), consisted of nature clips from the BBC's Planet Earth series with grand, awe-inspiring shots of scenic vistas, mountains, plains, forests, and canyons. Amusement video stimulus <https://youtu.be/osQoYz2cIGU>, captured amusing moments from the daily life of Antarctic penguins, and had been previously used by Yichao et al. (2021). The neutral emotion type video stimulus <https://www.youtube.com/watch?v=8YFK-djtLozc>, was a short documentary about goby fish, previously validated and used by Valdesolo et al. (2016) and found to be devoid of strong emotional responses.

Measures

NFC was measured with the 15-item short version (Roets & Van Hiel, 2011) of the NFC scale (Webster & Kruglanski, 1994; revised by Roets & Van Hiel, 2007). Sample items included "I don't like to go into a situation without knowing what I can expect from it" and "I would quickly become impatient and irritated if I would not find a solution to a problem immediately." Respondents completed the items on a 6-point scale from 1 (completely disagree) to 6 (completely agree), and responses across items were averaged such that higher scores would indicate higher levels of NFC. This study obtained a Cronbach's alpha of .84. For this version of the NFC scale, Roets and Van Hiel (2011) obtained Cronbach's alpha of .87, demonstrating good internal consistency.

Homosexuality Attitudes Scale (HAS; Kite & Deaux, 1986) consists of 21 items assessing people's stereotypes, misconceptions, and anxieties about

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homosexuals. Sample items include “Homosexuals should be forced to have psychological treatment” and “If I were a parent, I could accept my son or daughter being gay”. Respondents rate each item on a 5-point Likert scale ranging from ‘strongly agree’ to ‘strongly disagree’. The scale provides a unidimensional factor representing attitudes toward gay individuals and reported high internal consistency ($\alpha > .93$) and good test-retest reliability ($r = .71$). Cronbach’s alpha for this study was .95. A higher score on HAS represents a more favourable evaluation of homosexuals. The HAS has previously been utilized as a measurement to assess beliefs about homosexuals in several studies, for example, Keiller (2010).

Procedure

This study was approved by the ethics review panel at the University of Derby. Subsequently, participants were recruited using a variety of methods including Survey Circle, social media and University of Derby student platforms (details in Participants section above). The study was posted on these platforms using the Participant Invitation, which included the digital URL and QR code for the Qualtrics webpage where the study was hosted. Those interested in taking part in the study were invited to click on the URL or scan the QR code to access the virtual Participant Information Sheet which provided the details about the research aims and overview, and what they would be required to do if they decided to participate in the study. The Participant Information Sheet also stated that participation in the study was completely voluntary, anonymized, that there was an option to ‘opt out’ of the study anytime during or up to two weeks after their participation in the study, prior to the data analysis taking place, and that participants would be provided with a unique identifier code in order to withdraw. There was no reward or monetary benefit for participation, except those recruited via the RPS and Survey Circle who received points in the respective research participation schemes. There were no attempts to deceive the participants. Participants were informed of the approximate length of the study (15-20 minutes). This was followed by the GDPR regulations and Privacy notice. Once the candidates had thoroughly read the information sheet and the Privacy notice, they were asked to provide their consent in an Informed Consent Form. The consent form had a box the participant had to tick be-

fore continuing, confirming their informed consent.

Participants were then directed to the next section asking the following demographics – age, gender, and country of residence. After completing the demographic section, they were directed to the first task which was responding to the NFC short version scale. Upon completion of this task, using Qualtrics randomizer, they were randomly allocated to one of three groups – awe/amusement/neutral – and were asked to view the corresponding 4.43-minute-long emotion eliciting stimuli video. Participants were not able to fast forward or speed up the video at any stage and needed to watch the video in full at regular speed. After participants finished viewing the emotion eliciting stimulus video they were asked to report the intensity of their current emotions out of 14 options - “fear,” “anger,” “sadness,” “pride,” “awe,” “peacefulness,” “excitement,” “happiness,” “boredom,” “anxiety,” “love,” “surprise,” “amusement,” and “disgust” (1 = not at all; 7 = extremely). This emotional manipulation check has been previously used by Piff et al. (2015) and Rudd et al. (2012).

The last task for the participants was to respond to the HAS measuring their attitudes toward homosexual individuals. HAS was administered only once, after the experimental intervention, in line with previous studies using experimental manipulation of awe, for example, Stellar et al. (2018), and Yichao et al. (2021). Once the final task was completed, all participants were taken to the Debrief page and provided re-consent to their data being used by the research team, which concluded their participation in the study. The debrief informed them of the next steps in the study, clearly stating till which point they could withdraw. To do this, participants were going to be asked to provide their unique identification code and state to the researchers that they are no longer interested in participating in the study. They were also informed that upon request they will be able to access the final research paper if desired. Lastly, contact details of the researchers were provided to welcome the opportunity to ask any questions.

Analytic Strategy

Data imported from Qualtrics study were analyzed using SPSS. Outliers (z-scores greater than ± 2.58) were removed. Before conducting a 2 x 3 factorial ANOVA, the data from remaining participants were checked for parametric assumptions. The dependent variable (AGP) data were at interval level.

Since there were many groups in the 2 x 3 design of this study, and because normality of residuals rather than normality of variables is important in ANOVA (Kozak & Piepho, 2018), the residuals for AGP were examined for normality, which showed a deviation from normality. Subsequently, a Log 10 transformation was done on the AGP reflected data, and their residuals showed a normal distribution. Normality was also checked after splitting the data into each of the six (2 NFC levels x 3 Emotion types) IV combinations, each of which also showed a normal distribution. Homogeneity of variance was checked with a Levene's test. A 2 (NFC level) x 3 (Emotion type) factorial independent measures ANOVA was then conducted. Apart from the main analysis, a manipulation check was done to find if the awe stimulus generated higher mean levels of awe emotion as compared to the amusement stimulus and the neutral emotion stimulus, by conducting a one-way ANOVA. Normality and homogeneity of variance assumptions were checked before conducting the one-way ANOVA.

Results

Five univariate outlier cases with z-scores greater than +/- 2.58 were removed from the initial data set of 159 participants – with 3 from AGP data ($z = -3.00, -3.68, -3.00$) and 2 from NFC score data ($z = -2.71, -2.99$), leaving a sample of 154 respondents for analysis. The descriptive and normality test statistics are given in Table 1.

Manipulation Check

To determine whether the awe video stimulus elicited a higher level of awe emotion as compared to the amusement video and the neutral emotion video, an emotion manipulation check was done using a one-way ANOVA. The data were screened for normality assumptions before performing an ANOVA. Histograms and Q-Q plots showed a normal distribution. Inspection of box plots did not reveal any outliers. The z-scores for skewness of awe levels for awe, amusement, and neutral stimuli were -1.67, 1.36 and 0.15 respectively. The z-scores for kurtosis of awe levels for awe, amusement, and neutral stimuli were 1.62, -1.17 and -2.09 respectively - all within the acceptable +/- 2.58 range for a sample size of 154. The K-S and S-W tests being significant suggested the distribution deviated from normal, but ANOVA has been found to be robust enough to account for such small anomalies (Field, 2013). Levene's statistic was

not significant ($p = .34$), so homogeneity of variance was assumed. The descriptive and normality test statistics of data analysed using SPSS are given in Table 2.

A one-way ANOVA was used to examine the effect of the three different emotion stimuli on the level of awe elicited. The results revealed that there was a statistically significant difference in the mean level of awe elicited between at least two groups ($F(2, 151) = 8.35, p = .001$). Tukey's HSD Test for multiple comparisons found that the mean level of awe elicited was significantly different between awe stimulus and amusement stimulus ($p = 0.001, 95\% \text{ CI} = [.63, 2.50]$), as well as between awe stimulus and neutral stimulus ($p = .015, 95\% \text{ CI} = [.18, 2.06]$). Awe video stimulus generated more awe as compared to amusement or neutral video stimuli.

Assumptions Check

Based on the rationale given in the Analytic strategy earlier, the residuals for AGP were examined for normality. While the Zkurtosis (.51/.39 = 1.31) was in the desirable range of +/- 2.58, the Zskewness (-1.22/.19 = -6.42), histogram and Q-Q plots showed the residuals of AGP were not normally distributed. Thereafter, a Log 10 transformation was done on the AGP reflected data and its residuals were examined for normality which showed acceptable Zskewness (.49/.19 = -2.50) and Zkurtosis (1.00/.389 = 2.57) of between +/- 2.58 and close to normal histogram and Q-Q plots. Skewness and Kurtosis were then checked for the residuals of AGP Log 10 transformed reflected data for all six levels of IV conditions (3 emotion types x 2 NFC levels) separately. This too produced Zskewness and Zkurtosis scores between acceptable limits of +/- 2.58. While the residuals of Log 10 transformed AGP reflected data met the requirements of normality for conducting an ANOVA, the Levene's statistic was significant, $p = .014$, showing that homogeneity of variance cannot be assumed, and the results should be interpreted with caution (Field, 2013).

Main Analysis

Results of the factorial ANOVA revealed that, contrary to H1, there was no significant main effect of emotion type on AGP ($F(2, 148) = 0.06, p = .94, \eta p^2 = .001$). In contrast with H2, there was no significant main effect of NFC on AGP ($F(1, 148) = 2.01, p = .16, \eta p^2 = .013$). In contrast with H3, there was no significant interaction effect between NFC and emotion type on AGP ($F(2, 148) = 0.47, p = .62, \eta p^2 = .006$). For all groups, ηp^2 values suggested a small effect size.

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Discussion

In this study we examined if induced awe (compared to amusement or neutral emotions) reduces AGP, if high NFC (vs. low NFC) leads to higher AGP, and if NFC moderates the effect of awe on AGP. The results did not support the first hypothesis since participants in the awe condition did not differ in their reduction of AGP, from those in the amusement or neutral emotion conditions. The second hypothesis was also not supported since participants with high NFC did not significantly differ in their AGP scores from those with low NFC. Also, the results did not support the third hypothesis since no interaction effect of induced awe and NFC was found on AGP.

The finding that an awe-inducing intervention did not reduce AGP stands in contrast with the findings of Stancato and Keltner (2021) who found that induced awe (using similar stimuli as the present study) reduced conviction in attitudes towards racial outgroups. One point of difference between the two studies pertains to the demographic skew in the respective samples. Stancato and Keltner (2021) recruited their sample entirely from Amazon Turk whose respondent pool had a male skew (54% male), older age skew (70% aged >30 years) and had only 22.3% represented by student respondents (Levy et al., 2016). In contrast, the present study had a female skew (71% female), younger age skew (50% aged < 30 years and modal age = 23 years), and a student skew (64% students). Multiple studies have shown that women are less sexually prejudiced than men, and this difference is especially large among college students (Kite & Whitley, 1996). Younger people, especially students who volunteer to participate in sexuality-related research, also have more sexual experiences and less restrictive values than their peers (Wiederman, 1999). College students express less prejudice than an average individual (Judd et al., 1995) and are more aware of modern social proscription against the expression of prejudice (Crandall & Eshleman, 2003). College students have had more exposure to some form of diversity or antibias training (McCauley et al., 2000). This demographic skew of the sample could help explain the present study's significantly more favourable attitudinal responses to homosexuality than expected.

The results pertaining to the first hypothesis were however in line with Dale et al. (2020), who did not find a significant effect of induced awe on reduction of negative stereotypical attitudes toward African Amer-

icans. Dale et al. (2020) posited that individuals may not perceive the effects of induced awe beyond the emotion itself, and the attitudinal shifts that are expected to happen in response to the experience of awe are likely to be outside of conscious awareness thereby impacting only implicit attitudes and not explicit attitudes. Since both Dale et al. (2020) and this study used a prejudice scale measuring explicit attitudes, this may have led to insignificant effects of induced awe on prejudice reduction in both studies. Using scales measuring explicit attitudes could have also led to inauthentic measurement of prejudice in both cases. Specific to this study, another drawback of using an explicit scale for measuring AGP is the assumption that people will explicitly express their prejudice, which does not always happen, because of social desirability reasons (Steffens, 2005). Crandall and Eshleman's (2003) 'justification-suppression model' for prejudice expression posits that because of suppression by social norms people do not directly express their genuine prejudices. When it comes to prejudice, what is felt and what is reported are two different things.

Implicit measures like the Implicit Association Test (IAT) are rarely used in sexual prejudice research, but may provide more accurate results (Banse et al., 2001). In an experiment, Banse et al. (2001) conducted among 79 German students, attitudes towards gays and lesbians were tested using both an explicit scale and an IAT adapted from Greenwald et al. (1998). This study found that participants faked explicit attitudes (which were very positive) but could not fake implicit attitudes (which were relatively negative). In another study, Coffman et al. (2016) found that widely used explicit measures of anti-gay sentiments produce significant underestimation in existing surveys because of social desirability, even when responses are private and anonymized. Coffman et al. (2016) conducted an experiment where 2,516 U.S. participants were randomly assigned to either a "best practices method" that was computer-based and provided privacy and anonymity, or to a veiled elicitation method that provided even more anonymity since it did not allow inference of any answer to any individual but could be used to accurately estimate statistics about the population. The results showed that the veiled method increased the rates of anti-gay sentiment substantially. Respondents were 67% more likely to express disapproval of an openly gay manager at work and 71% more likely to say it is okay

to discriminate against lesbian, gay, or bisexual individuals. This could explain why attitudes towards homosexuals, as assessed with an explicit questionnaire in this study, showed higher than expected favourable results.

This study's findings could also imply that the nature of awe-inducing stimuli used in this study might not have been potent enough or directly relevant to the domain of effecting changes in sexual prejudicial attitudes. According to Shiota et al. (2007), approximately half of all awe experiences arise in response to awe-inspiring virtuous or magnanimous actions of people of high stature and the next largest category of awe elicitors is nature. Our elicitors of awe were quite mild and included images only in the domain of nature. This raises the questions of whether more intense elicitors of awe (like in-vivo or virtual reality experiences of awe through immersion in nature) or awe elicitors that were more directly related to the domain of prejudice (like speeches of inspiring public figures or virtuous individuals within a community) could be more effective in reduction of sexual prejudice.

The finding that NFC did not have a causal effect on AGP is contrary to Soenen et al. (2005), who found a significant correlation between these two constructs. A point of difference between these studies that could explain the unexpected results for the second hypothesis, is that the present study was done online, while Soenen et al.'s (2005) studies were conducted in-person. According to Krosnick (1991), some respondents take a shortcut to providing answers in a self-report questionnaire engaging in 'satisficing' behaviours like response non-differentiation, random responding, and speeding. These 'satisficing' behaviours are more prominent in online studies because of the ease of responding and lack of a sense of accountability because there is no supervision (Heerwegh & Loosveldt, 2008). It is possible that due to the online mode of conducting this study, the respondents showed higher 'satisficing' behaviours in their responses that led to measurement errors for AGP (Fricker et al., 2005).

Another reason for NFC not showing a main effect on AGP could be related to the individual differences in SDO and RWA levels for the participants. Soenen et al. (2005) found that homophobia had a stronger correlation with RWA than with SDO, and Van Hiel et al. (2004) found a positive effect of NFC on racial prejudice that was fully mediated by RWA but not SDO. A practical implication of Van Hiel et

al.'s (2004) findings is that the interventions aimed at reducing NFC could potentially reduce racial (and other forms of) prejudice by reducing the RWA levels, but would not be successful in reducing SDO levels; therefore, their impact would be substantial in individuals with high RWA but not significant in those with high SDO. While the present study's scope did not include the measurement of RWA and SDO levels in participants, it is possible that more participants with high NFC in this study had high SDO levels (and not high RWA levels), which is probably why NFC did not show the expected effect on AGP.

The finding that there was no interaction effect of awe and NFC on AGP was contrary to Dhont et al. (2011), where they found that NFC moderates the relationship between intergroup contact and racial prejudice. This contradiction could be because inter-group contact and awe work differently as prejudice-reducing interventions - while awe is a self-transcendent positive emotion that works through self-diminishment and humility (Shiota et al., 2007), intergroup contact works through reducing negative emotions of anxiety and fear about outgroups (Pettigrew & Tropp, 2008). Alternatively, it could be because racial prejudice has a higher correlation with NFC than sexual prejudice does with NFC (Soenen et al., 2005).

The results of this study had several implications. First, these results showed that the inducement of awe does not result in sexual prejudicial attitude changes at an explicit level (Dale et al., 2020). Second, these results suggested that factors beyond NFC (like RWA and SDO) may influence the effectiveness of awe-based interventions in reducing prejudice. And lastly, the nonsignificant results raised questions about the conditions under which awe might be effective in reducing sexual prejudice.

Limitations

This study had the following limitations. Firstly, like most research on sexual prejudice (Bartos et al., 2014) this study too used a standardised self-report sexual prejudice scale measuring explicit attitudes towards homosexuals. As discussed above, this could have led to inauthentic reporting of AGP. Dasgupta and Hunsinger (2008) noted that limited resources are the main reasons for performing online research on convenience samples, as was the case with the present study too. The second limitation of this study was employing a convenience sample that heavily skewed the

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demographics in favour of younger female students who, as discussed earlier, are less sexually prejudiced than the general population. Thirdly, this study used an online delivery mode that could have led to measurement errors. Fourthly, this study used a mild elicitor of awe in the domain of nature, not directly related to the domain of prejudice reduction. Lastly, this study did not consider the mediating roles that RWA and SDO could play on the effect of NFC on AGP.

Future research should consider making the following methodological modifications. First, use implicit measures like the IAT used by Banse et al. (2001) or veiled elicitation methods used by Coffman et al. (2016) to achieve a more 'authentic' assessment of AGP. Second, recruit a purposive sample to achieve more representative quotas for age, gender, and occupation to diminish the sampling bias (Bethlehem & Stoop, 2007). Third, conduct the study in an in-person laboratory setting instead of online to minimize measurement errors. Fourth, either use more potent elicitors of awe like an in-vivo or a virtual reality experience of awe in nature, or use awe stimuli like awe-inspiring speeches of virtuous individuals of stature, which would be in the domain of prejudice reduction. Fifth, measure the RWA and SDO levels in participants and assess the meditation effects of RWA and SDO variables on the impact of NFC on AGP.

Conclusion

In conclusion, this experimental study aimed to test if high NFC individuals show higher anti-gay prejudice, if induced awe can reduce anti-gay prejudice, and if it can do so more in prejudice prone (high NFC) individuals. While the results did not support any of the hypotheses, this study's findings contribute to the ongoing debate about whether and under what conditions prejudice can be reduced via induced awe in high NFC individuals. While some studies have shown awe to change prejudicial attitudes at an explicit level, some, including this study, have suggested that it does so only at an implicit level. Some studies have shown that mild awe elicitors like awe-inspiring nature videos are effective in attitude change, while some others including this study, posit that more potent elicitors of awe are required. Some studies have found that high NFC is linked to high levels of sexual prejudice, whereas some others have found that this relationship is more strongly mediated by RWA and not so much by SDO. The potential for this line of research continues

to hold. Future research with suitable methodological changes is recommended. Such suggested changes are: using implicit measures or veiled elicitation methods for authentic measurement of AGP, employing more potent elicitors of awe, assessing the mediating role of RWA and SDO on the effect of induced awe on sexual prejudice reduction, recruiting a purposive sample that is more representative of the general population, and conducting an in-person study instead of an online study to reduce measurement errors.

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Table 1

Anti-Gay Prejudice (AGP) Scores Across Emotion Stimulus and Need for Closure (NFC)

Independent Variable Levels	Mean AGP (SD)	95% CI lower	95% CI upper	Skewness (SE)	Kurtosis (SE)	K-S test sig.	S-W test sig.	N
Awe	94.92 (13.01)	91.34	98.51	-1.34 (.33)	.82 (.64)	.00	.00	53
Amusement	92.82 (15.86)	88.36	97.28	-1.25 (.33)	.34 (.66)	.00	.00	51
Neutral	93.00 (15.28)	88.66	97.34	-1.25 (.34)	.79 (.66)	.00	.00	50
High NFC	93.23 (16.60)	89.47	97.00	-1.16 (.27)	.13 (.54)	.00	.00	77
Low NFC	93.97 (12.57)	91.12	96.83	-1.44 (.27)	1.24 (.54)	.00	.00	77

Table 2*Elicited Awe Scores Across Emotion Stimulus*

Emotion type stimulus	Mean Awe level (SD)	95% CI lower	95% CI upper	Skewness (SE)	Kurtosis (SE)	K-S test sig.	S-W test sig.	<i>N</i>
Awe	4.64 (2.14)	4.05	5.23	-.55 (.33)	-1.04 (.64)	.00	.00	53
Amusement	3.08 (1.85)	2.56	3.60	.45 (.33)	-.77 (.66)	.00	.00	51
Neutral	3.52 (2.03)	2.94	4.10	.05 (.34)	-1.38 (.66)	.01	.00	50
Total	3.76 (2.11)	3.42	4.10					154