

The impact of awe on common ingroup identity: The moderating role of perceived resource scarcity

YANG Yang^{1,2}, CAO Jun^{1,2}, LI Xiaolin^{1,2}, E Yiran^{1,2}, JIA Yixin³

⁽¹⁾ Department of Psychology, Northwest Normal University, Lanzhou 730070, China)

⁽²⁾ Northwest Normal University Center for Education Development in Northwest Ethnic Minority Areas, Lanzhou 730070, China)

⁽³⁾ Lanzhou Dongfang School, Lanzhou 730070, China)

Abstract

Common ingroup identity refers to assigning a superordinate identity to two originally independent groups, transforming the cognitive representation of group members from two subgroups to one common ingroup, and extending positive feelings from ingroup members toward former outgroup members. Previous research on the factors influencing common ingroup identity has focused on cognitive and behavioral perspectives, such as how intergroup cooperation and perceived similarity can promote common ingroup identity. However, few studies have focused on the impact of awe on common ingroup identity and its boundary conditions.

This study examined the impact of awe on common ingroup identity and its boundary conditions through four experiments. Study 1 utilized a questionnaire to measure the relationships among trait awe, common ingroup identity, and perceived resource scarcity. Study 2 manipulated awe and perceived resource scarcity to explore the role of perceived resource scarcity in the relationship between awe and common ingroup identity. Study 3 adjusted the measurement method of common ingroup identity and investigated the influence of awe and perceived resource scarcity on common ingroup identity. Study 4 employed a modified awe induction paradigm and measured common ingroup identity using Chinese national identity scales, while adopting a multitrait-multimethod approach to enhance the reliability of the findings.

The findings revealed that participants in the awe group exhibited higher common ingroup identity than those in the control group, indicating that awe can promote common ingroup identity. Studies 1-4 identified perceived resource scarcity as a moderating factor between awe and common ingroup identity. Specifically, high perceived resource scarcity weakened the promoting effect of awe on common ingroup identity, compared to low perceived resource scarcity. Moreover, under conditions of high perceived resource scarcity, individuals in the negative awe group showed lower common ingroup identity than those in the positive awe and control groups. These findings not only expand the research perspective on ingroup identity but also help strengthen group cohesion.

Keywords Positive Awe, Threat-Based Awe, Perceived Resource Scarcity, Common Ingroup Identity

1 Introduction

Regardless of whether it is a waterfall suspended in the sky, an extensive grassland, or merciless natural disasters such as earthquakes, floods, and plagues, they can all evoke a sense of awe in individuals. Awe is an emotional experience that the self undergoes when faced with something broader, greater, and beyond the current level of comprehension (Keltner & Haidt, 2003). It can be categorized into positive awe and threat-based awe (Gordon et al., 2017). Positive awe is a strong emotional experience of reverence and wonder triggered by non-threatening stimuli, such as the magnificent nature; while threat-based awe is a strong emotional experience of fear and wonder that individuals have when facing threats, such as floods (Gordon et al., 2017; Li et al., 2024; Zhao et al., 2023). Previous research has found that awe can promote intergroup relations. For instance, awe can ease the stigmatization of people with AIDS (Luo et al., 2022). This might be because awe enhances an individual's high-level connection with others or the world (Yaden et al., 2019), and this sense of connection is conducive to diminishing stigmatization (Brannon & Walton, 2013).

However, current research on the promotion of intergroup relationship by awe has not fundamentally change group iden-

tity, while common ingroup identity can promote intergroup relationship by changing group identity. Common ingroup identity refers to the assignment of a superordinate identity to two originally independent groups, transforming the cognitive representation of group members from two subgroups into a common ingroup, and extending the positive emotions towards from ingroup members to the former outgroup members (Gaertner et al., 1993). For instance, for people of different ethnic groups, the higher-level identity is the Chinese nation, and the common ingroup identity is the identity of the Chinese nation. For students from different classes, the higher-level identity is being a student of the same school, and the common ingroup identity is the identity of being a student of this school. Compared with the previous approach of enhancing the sense of connection through awe to promote intergroup relationship, the common ingroup identity can more effectively promote intergroup relations by constructing a higher-level identity, directly transforming the former outgroup members into ingroup members. For example, previous studies have shown that common ingroup identity not only facilitates the reduction of intergroup prejudice (Guan & Rong, 2020), but also promotes an increase in prosocial behavior (Levine et al., 2005). Moreover, it can enhance the intimacy among members of different

Corresponding Author: YANG Yang, E-mail: yy20111219@163.com

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ethnic groups (Leung et al., 2022), foster psychological integration (Liang et al., 2020), and elevate cohesion and the sense of belonging (Ufkes et al., 2016).

According to the self-diminishment of awe (Jiang et al., 2024; Seo et al., 2023) and the self-transcendence hypothesis (Lin et al., 2025; Jiang et al., 2024; Jiang & Sedikides, 2022), on the one hand, awe may generate a sense of “small self”, prompting individuals to integrate themselves into social collectives (Chen & Boucher, 2008) to fulfill their need for affiliation; on the other hand, awe may expand the boundaries of the self and establish connections with the outside world. For instance, the research found that awe can promote global identity (Seo et al., 2023). This suggests that awe may foster common ingroup identity.

However, can awe promote the common ingroup identity under all circumstances? Previous research has found that perceived resource scarcity moderates the relationship between common threats and intergroup cooperation. That is, under conditions of high perceived resource scarcity, common threats not only fail to promote but even hinder intergroup cooperation (Miao et al., 2023), while intergroup cooperation is conducive to the formation of a common ingroup identity (Adachi et al., 2016). Here, the common threat refers to the threats that humanity faces such as earthquakes, floods, and epidemics, and earthquakes and floods can also evoke individual awe. Then, is the influence of awe on the identification with the common ingroup also regulated by perceived resource scarcity?

According to the scarcity theory (Mani et al., 2013), when individuals perceive resource scarcity, they focus their attention on the scarce resources, thereby reducing their “cognitive bandwidth”, magnifying the self, and hindering the generation of a sense of “small self”. At the same time, outgroups are very likely to be regarded as competitors vying for limited resources with oneself (Gamez-Djokic & Waytz, 2020), which is not conducive to expanding the connection between the self and the outside world, and thus is not conducive to promoting common ingroup identity through awe. However, existing literature has not further explained how perceived resource scarcity moderates the impact of awe on common ingroup identity. This study, from the perspective of emotions, aims to explore the impact of awe on common ingroup identity and the moderating role of perceived resource scarcity. It not only provides evidence that awe can more directly and effectively promote intergroup relationship, but also summarizes the experiences after major crises such as the epidemic and earthquakes, providing implications for the country to deal with corresponding crises.

1.1 The Relationship between Reverence and Common Ingroup Identity

Awe may promote common ingroup identity. Currently, there are two hypotheses regarding awe: the self-diminishment hypothesis and the self-transcendence hypothesis. The self-diminishment hypothesis posits that awe can change the self-concept by encountering something greater than the self, reducing self-awareness, weakening the individual self component within the self-concept, generating a sense of smallness, and forming a “small self” (Jiang et al., 2024; Seo et al., 2023). When individuals feel insignificant, they often have a stronger desire to find a sense of belonging to alleviate their inner loneliness and helplessness (Stellar et al., 2017), integrate themselves into social collectives (Chen & Boucher, 2008), and enhance their sense of unity with others (Waugh & Fredrickson,

2006). Consequently, they form a “universal” category membership representation, categorizing both ingroup and outgroup members under a higher-level group (Dovidio et al., 1995; Gaertner et al., 1993).

The self-transcendence hypothesis hypothesizes that awe prompts individuals to break through self-imposed limitations, expand their self-concept, transcend self-centeredness, shift their focus from mundane matters to greater spiritual needs, provide a broader perspective on the self, and foster self-insight and the motivation to pursue one's true self. It emphasizes the connection between the self and the environment, and encourages a more integrated view of the self and the world (Lin et al., 2025; Jiang et al., 2024; Jiang & Sedikides, 2022). Unlike the self-defeating “small self” assumption, which promotes connection with the outside world by belittling oneself, the self-transcendence assumption emphasizes establishing connections with the outside world by expanding the boundaries of the self. For instance, the present research initially verified the relationship between awe and common ingroup identity. They manipulated awe through recall writing tasks, pictures, and videos to examine its impact on global citizenship identity. The results revealed that awe transcended the sense of smallness, broadened the self-concept, enhanced the sense of connection with larger entities, and promoted global citizenship identity (Seo et al., 2023).

Furthermore, awe may prompt individuals to reduce uncertainty by seeking order or coherence, encourage individuals to adopt a bottom-up cognitive processing approach, adjust existing mental frameworks to accommodate new information or experiences, thereby expanding the knowledge system (Jiang et al., 2024), reduce outgroup stereotypes (Luo et al., 2022), promote connection with humanity and ingroup prosocial behavior (Luo et al., 2023). For instance, research found in their research on awe and prosocial behavior during the COVID-19 pandemic that awe can support a country's fight against the pandemic by enhancing the connection with all humanity and the world and fostering empathy for patients (Luo et al., 2023). Therefore, this study hypothesizes that awe promotes common ingroup identity (Hypothesis 1).

1.2 The Moderating Role of Perceived Resource Scarcity

Then, can awe promote common ingroup identity in all circumstances? When individuals perceive that the required resources exceed the resources they possess, a sense of resource scarcity emerges (Mullainathan & Shafir, 2013). Perceived resource scarcity may not only stem from an objective lack of resources, but also from people's subjective feeling that they have too few resources (DeSousa & Rego, 2022). For instance, people with relatively good economic conditions may still feel resource-scarce when compared to those who are even wealthier (Mullainathan & Shafir, 2013). This indicates that even if resources are objectively abundant, some cues related to scarcity could still make people feel resource-scarce (Roux et al., 2015). Just as during the COVID-19 pandemic, when people were exposed to false information about the scarcity of medical resources, they still felt that resources were scarce, despite the fact that there were actually sufficient resources available (Miao et al., 2023).

According to the scarcity theory (Mani et al., 2013), when people perceive resource scarcity, they tend to focus on the interests of their own group related to scarcity rather than the common fate across groups. Perceived resource scarcity makes

individuals concentrate their attention on areas where scarcity is prominent, reducing “cognitive bandwidth” and focusing on immediate interests (Mani et al., 2013, Shah et al., 2012). Therefore, compared with low perceived resource scarcity, under conditions of high perceived resource scarcity, individuals may focus more on resource acquisition and survival needs, reduce resource allocation to others (Cui et al., 2022), and become more selfish (Roux et al., 2015). On the one hand, this unconsciously magnifies the self, prevents the emergence of a sense of smallness, and regards other group members as rivals competing for limited resources, thereby leading to group competition (Gamez-Djokic & Waytz, 2020), reducing intergroup cooperation (Miao et al., 2023), and lowering the common ingroup identity. On the other hand, when individuals perceive a shortage of resources, they tend to be more self-centered (Roux et al., 2015), focusing more on the currently scarce resources and finding it difficult to shift their attention to greater spiritual needs, engage in profound self-exploration, and thus fail to expand their self-boundaries, establish connections with the outside world, and form a common ingroup identity.

However, under conditions of low perceived resource scarcity, when individuals experience awe, it can induce a sense of smallness, connecting them with others (Stellar et al., 2017). It may also break through self-imposed limitations, transcend self-boundaries, expand the self-concept, and thereby enhance the representation of membership in the “universal” category within the self-concept. This changes the group representation from “us” and “them” to a higher-level “us”, thus reclassifying separate groups into an inclusive higher-level group (Gaertner et al., 1993). Therefore, compared with low perceived resource scarcity, high perceived resource scarcity will weaken the promoting effect of awe on common ingroup identity (Hypothesis 2).

We confirmed the research hypotheses through four studies. Study 1 explores the relationship among trait awe, common ingroup identity, and perceived resource scarcity through a questionnaire survey; Studies 2 and 3 induce awe through videos and manipulate perceived resource scarcity to further investigate the promoting effect of awe on common ingroup identity. Study 4, based on Study 3, employed the recall-writing paradigm to manipulate awe and used the Chinese National Identity Scale to measure common ingroup identity, aiming to further investigate the influence of awe and perceived resource scarcity on common ingroup identity.

2 Study 1 The Relationship among Trait Awe, Common Ingroup Identification and Perceived Resource Scarcity

Study 1 aimed to investigate the relationship among trait awe, common ingroup identity and perceived resource scarcity through a questionnaire survey.

2.1 Participants

This study used G*Power 3.1 (Faul et al., 2009) to estimate the sample size needed. Based on the previous study by Preston and Shin (2017), it was predicted that at a significance level of $\alpha = 0.05$ and a medium effect size ($f = 0.25$), a sample size of at least 120 would be required to achieve a statistical power of 80%. A total of 408 college students were recruited as participants. After excluding invalid data such as incomplete responses, responses with extremely short completion times, and regular patterns of answers, 376 valid responses were obtained

(101 males and 275 females; 329 Han and 47 Minority). The actual statistical power level was 99.88%. The age of the participants was 20.72 ± 2.05 years. To verify the validity of the data obtained through the actual sample size, a sensitivity analysis was conducted. The results revealed that this sample size provided 85% power to detect an effect size of $f = 0.15$ or larger at a 5% false positive rate.

2.2 Measuring Tools

The Dispositional Awe Scale. Drawing on the research (Xin et al., 2021), the subscale from the Dispositional Positive Emotion Scales (DPES) (Shiota et al., 2006) is adopted to measure awe. The scale consists of 6 questions, including a series of descriptions related to awe, such as “I often feel awe” and “There is beauty all around me”. The scoring is on a 7-point Likert scale, with 1 indicating “strongly disagree” and 7 indicating “strongly agree”. A higher score indicates a higher level of trait awe. The internal consistency coefficient in this study was 0.75.

The Common Ingroup Identity Scale. According to the research by Zhou et al. (2018), the adapted Common Ingroup Identity Scale (Cakal et al., 2016; Ufkes et al., 2015) was used. According to the research content, the original scale’s expressions were modified, with the common ingroup being expressed as “students at this school”. For instance, “In our school, whether they are from our own ethnicity or from other ethnicities, all students are part of this school. As a student at this school, I feel extremely happy”, “In our school, whether they are from our own ethnicity or from other ethnicities, all students are part of this school. This identity is very important to me”. This scale consists of 2 items. It uses a 7-point scoring rule, where 1 indicates “strongly disagree” and 7 indicates “strongly agree”. In this study, the correlation coefficient between the two items is 0.63.

Perceived resource scarcity: Drawing on the research of Pitesa and Thau (2018), the degree of perceived resource scarcity is measured through five questions, such as “Basic resources are scarce.” A score of 1 indicates “Strongly disagree”, and 7 indicates “Strongly agree”. The higher the score, the higher the perceived resource scarcity. The internal consistency coefficient of the questionnaire is 0.93.

Table 1
Correlation of Gender, Age, Awe, Common Ingroup Identity and Perceived Resource Scarcity

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Gender	0.73	0.44	1				
2. Age	20.72	2.05	0.18***	1			
3. Awe	4.57	0.91	0.03	0.05	1		
4. Common Ingroup Identity	5.73	1.07	0.01	-0.09	0.34***	1	
5. Perceived Resource Scarcity	3.44	1.06	0.12*	-0.04	-0.25***	-0.18***	1

Note. *** $p < 0.001$, * $p < 0.05$; Gender: Male = 0, Female = 1

2.3 Results

Common method bias test. Exploratory factor analysis was used to test for possible common method variance. An exploratory factor analysis was conducted on all items of the integrated questionnaire, and the first common factor explained

Table 2

Test of the Moderating Effect of Perceived Resource Scarcity

Dependent Variable	Independent Variable	β	t	95% CI	R^2	F
Common Ingroup Identity	Awe	0.38	6.49***	[0.27, 0.50]	0.14	19.90
	Perceived Resource Scarcity	-0.08	-1.52	[-0.18, 0.02]		
	Awe \times Perceived Resource Scarcity	-0.12	-2.37*	[-0.22, -0.02]		

Note. *** $p < 0.001$, * $p < 0.05$, all two-sided tests.

34.59% of the variance, which was less than 40%. Therefore, there was no serious issue on common method variance in the variables involved in this study.

Descriptive statistics and correlation analysis. As shown in Table 1, the results of descriptive statistics and correlation analysis for each variable are as follows.

The moderating effect of perceived resource scarcity. The PROCESS model 1 was used to test the moderating effect, and all predictor variables were standardized. Awe was set as the independent variable, common ingroup identity as the dependent variable, and perceived resource scarcity as the moderating variable. The moderating effect of perceived resource scarcity between awe and common ingroup identity was examined, and the results are shown in Table 2.

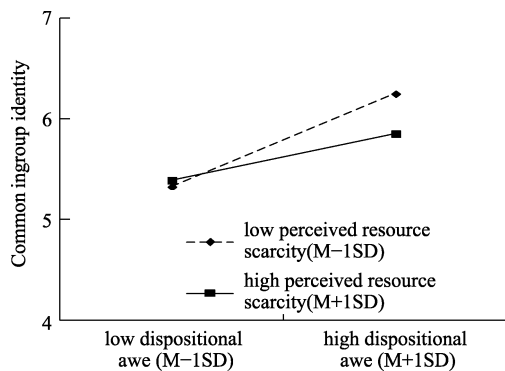


Figure 1. The Moderating Effect of Perceived Resource Scarcity on the Relationship between Awe and common ingroup identity.

Awe positively predicts common ingroup identity. The moderating effect of perceived resource scarcity between awe and common ingroup identity is significant, $\beta = -0.12$, $t = -2.37$, $p = 0.019$, 95% CI = [-0.22, -0.02]. Further simple slope analysis indicates (see Figure 1) that in the low perceived resource scarcity group ($M - 1 SD$), awe positively predicts common ingroup identity, $\beta = 0.51$, $t = 6.15$, $p < 0.001$, 95% CI = [0.35, 0.67]; while in the high perceived resource scarcity group ($M + 1 SD$), although awe also positively predicts common ingroup identity, $\beta = 0.25$, $t = 3.33$, $p = 0.001$, 95% CI = [0.10, 0.40], the strength of this relationship weakens. This indicates that a high perception of resource scarcity weakens the positive predictive effect of awe on common ingroup identity.

2.4 Discussion

Study 1 investigated the relationship among trait awe, perceived resource scarcity, and common ingroup identity. The results revealed that trait awe positively predicted common ingroup identity, and perceived resource scarcity played a moderating role. Specifically, compared with low perceived resource scarcity, high perceived resource scarcity buffered the positive predictive effect of trait awe on common ingroup identity. However, Study 1 investigated the relationship among the

three through questionnaires and could not answer the effect of awe on common ingroup identity. Study 2 further explored the promoting effect of awe on common ingroup identity and the moderating role of perceived resource scarcity by manipulating awe and perceived resource scarcity.

3 Study 2: The Impact of State Awe on Common Ingroup Identity: The Moderating Role of Perceived Resource Scarcity

Study 2 manipulated awe and perceived resource scarcity by having participants watch videos and read articles about the scarcity of medical resources in the context of the epidemic, respectively, to further investigate the impact of awe on common ingroup identity.

3.1 Method

This study employed a two-factor between-subjects design: 3 (Positive Awe vs. Threat-based Awe vs. Control Group) \times 2 (high perceived resource scarcity vs. low perceived resource scarcity). The dependent variable was measured by the score of the Common Ingroup Identity Scale.

This study used G*Power 3.1 (Faul et al., 2009) to estimate the sample size. Referring to the research on awe by Preston and Shin (2017), it was predicted that at a significance level of $\alpha = 0.05$ and a medium effect size ($f = 0.25$), a sample size of at least 158 participants would be needed to achieve a statistical power level of 80%. A total of 240 college students were recruited as participants. After excluding invalid data such as incomplete responses, responses with extremely short completion times, and regular responses, 216 valid responses were obtained (152 males and 64 females; 196 Han and 20 from Minority). The actual statistical power level reached to 91.47%. The average age of the participants was 18.47 ± 0.80 years old. The results of the sensitivity analysis indicate that this sample size provides 85% power to detect an effect size of $f = 0.23$ or greater at a 5% false positive rate. Among them, there were 35 participants in the positive awe - high perceived resource scarcity group, 36 in the positive awe - low perceived resource scarcity group; 36 in the threat-based awe - high perceived resource scarcity group, 35 in the threat-based awe - low perceived resource scarcity group; 35 in the control group - high perceived resource scarcity group, and 39 in the control group - low perceived resource scarcity group. All participants voluntarily took part in the experiment, had normal vision or corrected-to-normal vision, and no cognitive impairments. They signed informed consent forms before the experiment and received certain remuneration after its completion.

3.2 Procedure and Materials

Following the video task manipulation of awe used by Piff et al. (2015), the positive awe group participants watched video clips selected from the BBC documentary "Earth: One Amazing Day!", which featured the beautiful landscapes of nature. The threat-based awe group watched video clips of "Born to

Destroy”, which included scenes of earthquakes, floods, hurricanes, etc. The control group watched clips of the assembly process of a wooden wardrobe (Liu et al., 2022). Each video clip was approximately 2 to 3 minutes. After watching the video, participants were asked to fill out an emotion self-report scale adapted from Gross and Levenson (1995) for manipulation checks. They were required to rate their experiences of awe, surprise, happiness, joy, fear, and anxiety on a 7-point scale, where 1 indicated “completely inconsistent” and 7 indicated “completely consistent”. The average score of awe and wonder represents the level of awe (with a correlation coefficient of 0.54), the average score of happiness and joy represents positive emotions (with a correlation coefficient of 0.85), and the average score of fear and anxiety represents negative emotions (with a correlation coefficient of 0.64, Wang et al., 2024).

Secondly, the manipulation of perceived resource scarcity was achieved by having participants read false articles (Pereira et al., 2022). Participants were randomly assigned to either a high or low perceived resource scarcity group. In the high perceived resource scarcity group, participants read the following: “In 2026, on average, each country will have scarce pandemic medical resources. The average pandemic medical resources of all countries worldwide can only meet the needs of 19.60% of their citizens. Therefore, the medical resources for dealing with pandemics in all countries are extremely scarce.” In the low-perceived resource scarcity group, participants read the following: “In 2026, each country on average will have sufficient medical resources for pandemics. The average medical resources for pandemics across all countries globally can meet the needs of 112.80% of their citizens, thus the medical resources for pandemic response in each country are very abundant.” After the manipulation, the manipulation check was conducted using the perceived resource scarcity items from Study 1, with an internal consistency coefficient of 0.88.

Finally, the participants completed the Common Ingroup Identity Scale (as in Study 1, the correlation coefficient of the two items was 0.56) and provided demographic information such as age and gender.

3.3 Results

Manipulation check. A one-way ANOVA was conducted with emotion priming as the independent variable and the participants’ feelings of awe, positive emotions, and negative emotions as the dependent variables. The results revealed significant differences in awe among the positive awe group, the threat-based awe group, and the control group, $F(2, 213) = 18.22, p < 0.001, \eta^2 = 0.146$. Post hoc multiple comparisons

showed that the positive awe group ($M = 4.77, SD = 1.33$) had a higher awe experience score than the control group ($M = 3.51, SD = 1.59, p_{Bonferroni} < 0.001, Cohen's d = 0.85$), and the threat-based awe group ($M = 4.75, SD = 1.37$) also had a higher score than the control group ($p_{Bonferroni} < 0.001, Cohen's d = 0.83$). However, there was no significant difference between the positive awe group and the threat-based awe group ($p_{Bonferroni} = 0.999$). There were significant differences in positive emotions among the positive awe group, the threat-based awe group, and the control group, $F(2, 213) = 11.47, p < 0.001, \eta^2 = 0.097$. The positive awe group had significantly higher scores in positive emotion experience ($M = 4.20, SD = 1.48$) than the threat-based awe group ($M = 2.83, SD = 2.05, p_{Tamhane'T2} < 0.001, Cohen's d = 0.77$) and the control group ($M = 3.52, SD = 1.53, p_{Tamhane'T2} = 0.021, Cohen's d = 0.45$). There were also significant differences in negative emotions among the positive awe group, the threat-based awe group, and the control group, $F(2, 213) = 48.97, p < 0.001, \eta^2 = 0.315$. The threat-based awe group had significantly higher scores in negative emotion experience ($M = 4.30, SD = 1.55$) than the positive awe group ($M = 2.22, SD = 1.28, p_{Bonferroni} < 0.001, Cohen's d = 1.47$) and the control group ($M = 2.35, SD = 1.38, p_{Bonferroni} < 0.001, Cohen's d = 1.33$). This indicates that the manipulation of positive awe and threat-based awe was successful.

A 3 (positive awe vs. threat-based awe vs. control group) \times 2 (perceived resource scarcity: high vs. low) between-subjects analysis of variance was conducted with the manipulation check of perceived resource scarcity as the dependent variable. The results showed that the main effect of awe was not significant, $F(2, 210) = 0.77, p = 0.464$; the main effect of perceived resource scarcity was significant, $F(1, 210) = 39.43, p < 0.001, \eta^2 = 0.158$. The high perceived resource scarcity group ($M = 3.20, SD = 0.87$) perceived resources as scarcer than the low perceived resource scarcity group ($M = 2.47, SD = 0.86, \Delta M = 0.73, \Delta M95\% CI = [0.51, 0.97]$). There was no interaction effect between awe and perceived resource scarcity, $F(2, 210) = 2.25, p = 0.108$. This indicates that the manipulation of perceived resource scarcity was successful.

The differences in emotions induced by different awe conditions were tested. A one-way ANOVA was conducted with awe as the independent variable and happiness, joy, fear, and anxiety as the dependent variables. The results showed that there were significant differences in happiness, joy, fear, and anxiety among the positive awe, threat-based awe, and control groups (see Table 3). Therefore, in the subsequent analysis, emotions such as happiness, joy, fear, and anxiety were controlled.

Table 3
Difference Test of Different Emotions Induced by Different Awe Conditions in Study 2

Emotion	F	p	η^2	Positive awe vs Control group		Awe based on threat vs Control group		Positive awe vs Awe based on threat		Positive awe M \pm SD	Awe based on threat M \pm SD	Control group M \pm SD
				p	d	p	d	p	d			
Happiness	15.03	<0.001	0.124	0.005	0.53	0.040	0.42	<0.001	0.89	4.32 \pm 1.47	2.76 \pm 2.02	3.51 \pm 1.56
Joy	7.16	<0.001	0.063	0.134	0.33	0.169	0.32	0.001	0.61	4.09 \pm 1.62	2.90 \pm 2.20	3.53 \pm 1.73
Fear	52.55	<0.001	0.330	0.767	0.14	<0.001	1.32	<0.001	1.52	2.03 \pm 1.29	4.44 \pm 1.84	2.23 \pm 1.49
Anxiety	25.34	<0.001	0.192	0.999	0.04	<0.001	1.01	<0.001	1.01	2.41 \pm 1.67	4.16 \pm 1.78	2.47 \pm 1.54

Note. F-test, $df = (2, 213)$

The interaction effect between awe and perceived resource scarcity. A between-subjects analysis of variance was conducted with awe (positive awe vs. threat-based awe vs. control group) and perceived resource scarcity (high vs. low) as independent variables, and common ingroup identity as the dependent variable, with happiness, well-being, fear, and anxiety as control variables. The results revealed that the main effect of awe was significant, $F(2, 206) = 13.48, p < 0.001, \eta^2 = 0.116$. The scores of common ingroup identification of the positive awe group and the threat-based awe group were significantly higher than those of the control group ($M_{\text{control group}} = 5.44, SD = 1.27, M_{\text{positive awe}} = 6.30, SD = 0.69, p < 0.001, \Delta M = 0.86, \Delta M95\% \text{ CI} = [0.51, 1.15]$; $M_{\text{threat-based awe}} = 5.94, SD = 0.87, p = 0.009, \Delta M = 0.50, \Delta M95\% \text{ CI} = [0.12, 0.85]$), and there was no significant difference in the scores of common ingroup identification between the positive awe group and the threat-based awe group ($p = 0.083$). The main effect of perceived resource scarcity was significant, $F(1, 206) = 8.30, p = 0.004, \eta^2 = 0.039$. Compared with the low-perceived resource scarcity group, the high-perceived resource scarcity group had a lower score of common ingroup identification ($M_{\text{high perceived resource scarcity}} = 5.69, SD = 1.08; M_{\text{low perceived resource scarcity}} = 6.07, SD = 0.96, \Delta M = 0.38, \Delta M95\% \text{ CI} = [0.12, 0.64]$).

Importantly, the interaction effect between awe and perceived resource scarcity is significant, $F(2, 206) = 4.91, p = 0.008, \eta^2 = 0.045$. Further simple effect analysis shows that in the positive awe group, there is no significant difference in common ingroup identification based on perceived resource scarcity ($M_{\text{high perceived resource scarcity}} = 6.20, SD = 0.80; M_{\text{low perceived resource scarcity}} = 6.40, SD = 0.57$), $F(1, 206) = 0.50, p = 0.479$. In the control group, the difference remains insignificant ($M_{\text{high perceived resource scarcity}} = 5.41, SD = 1.42; M_{\text{low perceived resource scarcity}} = 5.46, SD = 1.14$), $F(1, 206) = 0.020, p = 0.889$. However, in the threat-based awe group, the common ingroup identification score of the high perceived resource scarcity group is significantly lower than that of the low perceived resource scarcity group ($M_{\text{high perceived resource scarcity}} = 5.47, SD = 0.74; M_{\text{low perceived resource scarcity}} = 6.41, SD = 0.72$), $F(1, 206) = 17.48, p < 0.001, \Delta M = 0.94, \Delta M95\% \text{ CI} = [0.51, 1.41], \eta^2 = 0.078$. (see Figure 2).

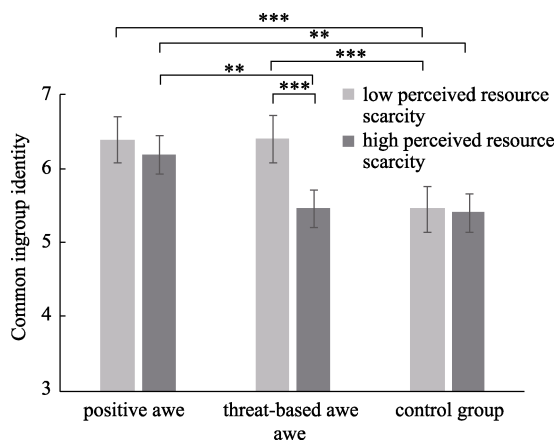


Figure 2. The Effect of Variants of Awe and Perceived Resource Scarcity on Common Ingroup Identity.

Given that existing research holds that threat-based awe is not a negative variant of awe but rather a compound emotion

that encompasses both fear and awe (Chaudhury et al., 2022), if threat-based awe is regarded as a compound emotion, how does awe influence ingroup identity? A between-subjects analysis of variance was conducted with awe and perception of resource scarcity as independent variables, common ingroup identity as the dependent variable, and happiness, well-being, and anxiety as control variables. The factorial design was 3 (positive awe vs. threat-based awe vs. control group) \times 2 (high perception of resource scarcity vs. low perception of resource scarcity). The results revealed that the main effect of awe was significant, $F(2, 207) = 13.57, p < 0.001, \eta^2 = 0.116$. The scores of common ingroup identification of the positive awe group and the threat-based awe group were significantly higher than those of the control group ($M_{\text{control group}} = 5.44, SD = 1.27, M_{\text{positive awe}} = 6.30, SD = 0.69, p < 0.001, \Delta M = 0.86, \Delta M95\% \text{ CI} = [0.51, 1.15]$; $M_{\text{threat-based awe}} = 5.94, SD = 0.87, p = 0.005, \Delta M = 0.50, \Delta M95\% \text{ CI} = [0.15, 0.83]$), and there was no significant difference in the scores of common ingroup identification between the positive awe group and the threat-based awe group ($p = 0.062$). The main effect of perceived resource scarcity was significant, $F(1, 207) = 8.66, p = 0.004, \eta^2 = 0.040$. Compared with the low-perceived resource scarcity group, the high-perceived resource scarcity group had a lower score of common ingroup identification ($M_{\text{high perceived resource scarcity}} = 5.69, SD = 1.08; M_{\text{low perceived resource scarcity}} = 6.07, SD = 0.96, \Delta M = 0.38, \Delta M95\% \text{ CI} = [0.13, 0.64]$).

Notably, the interaction effect between awe and perceived resource scarcity was significant, $F(2, 207) = 4.94, p = 0.008, \eta^2 = 0.046$. The simple effect analysis showed that in the positive awe group, there is no significant difference in common ingroup identification based on perceived resource scarcity ($M_{\text{high perceived resource scarcity}} = 6.20, SD = 0.80; M_{\text{low perceived resource scarcity}} = 6.40, SD = 0.57$), $F(1, 207) = 0.51, p = 0.476$. In the control group, the difference remained insignificant ($M_{\text{high perceived resource scarcity}} = 5.41, SD = 1.42; M_{\text{low perceived resource scarcity}} = 5.46, SD = 1.14$), $F(1, 207) = 0.011, p = 0.915$. However, in the threat-based awe group, the common ingroup identification score of the high perceived resource scarcity group was significantly lower than that of the low perceived resource scarcity group ($M_{\text{high perceived resource scarcity}} = 5.47, SD = 0.74; M_{\text{low perceived resource scarcity}} = 6.41, SD = 0.72$), $F(1, 207) = 17.93, p < 0.001, \Delta M = 0.94, \Delta M95\% \text{ CI} = [0.51, 1.41], \eta^2 = 0.080$. (see Figure 3).

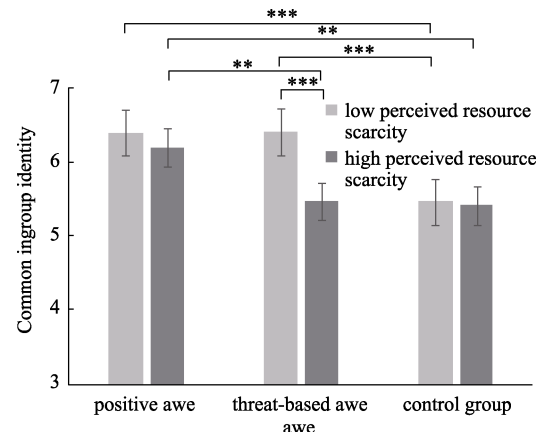


Figure 3. The Effect of Awe Based on Mixed Emotions and Perceived Resource Scarcity on Common Ingroup Identity.

3.4 Discussion

The results in Study 2 indicate that whether threat-based awe is regarded as a variant of awe or a compound emotion, both positive awe and threat-based awe can promote ingroup identification. Moreover, high perceived resource scarcity inhibits the promoting effect of threat-based awe on ingroup identification, supporting Hypotheses 1 and 2. However, in Study 1 and Study 2, the measurement of common ingroup identity was too simplistic, relying solely on the indicator of student status. Moreover, the measurement items confused ethnic identity with student identity. Therefore, in Study 3, the measurement items were revised to separately assess the identities of being a student and a member of the Chinese nation in order to examine common ingroup identity.

4 Study 3: The Impact of State Awe on Common Ingroup Identity: Based on the Identity of Students and Members of the Chinese Nation

Study 3 used the degree of identification with student status and as a member of the Chinese nation as indicators of common ingroup identity, and once again verified the moderating effect of perceived resource scarcity on awe and common ingroup identity, with the aim of making the research results more reliable.

4.1 Method

This study adopted a two-factor between-subjects design: 3 (positive awe vs. threat-based awe vs. control group) \times 2 (high perceived resource scarcity vs. low perceived resource scarcity). The dependent variable was measured by the score of the Ingroup Identification Scale.

This study used G*Power 3.1 (Faul et al., 2009) to estimate the sample size. According to the research on awe by Preston and Chin (2017), it was predicted that at a significance level of $\alpha = 0.05$ and a medium effect size ($f = 0.25$), a sample size of at least 158 participants would be required to achieve a statistical power level of 80%. The actual participants were 250 college students. After eliminating invalid data such as incomplete responses, responses with abnormally short completion times, and regular patterns of answers, 220 valid responses were obtained (97 males and 123 females; 203 Han and 17 from Minority). The actual statistical power level was 91.97%. The sensitivity analysis results show that this sample size provides 80% power to detect an effect size of $f = 0.22$ or greater at a 5% false positive rate. Among them, there are 36 participants in the positive awe - high perceived resource scarcity group, 36 in the positive awe - low perceived resource scarcity group; 39 in the threat-based awe - high perceived resource scarcity group, 37 in the threat-based awe - low perceived resource scarcity group; 36 in the control group - high perceived resource scarcity group, and 36 in the control group - low perceived resource scarcity group. All participants voluntarily participated in the experiment, had normal vision or corrected vision, and no cognitive impairments. They signed the informed consent form before the experiment and received certain remuneration after the experiment.

4.2 Procedure and Materials

First, awe manipulation was conducted (as in Study 2). After watching the video, participants filled out the self-report emotion scale (as in Study 2), with correlation coefficients of 0.64, 0.88, and 0.68 respectively. Next, perceived resource scarcity was manipulated (as in Study 2). After the manipula-

tion, a manipulation check for perceived resource scarcity was conducted (as in Study 2), with an internal consistency coefficient of 0.86. Secondly, perceived resource scarcity was manipulated (as in Study 2). After the manipulation, a manipulation check for perceived resource scarcity was conducted (as in Study 2), with an internal consistency coefficient of 0.86. Thirdly, the participants completed the Common Ingroup Identity Scale (Zhou et al., 2018), with the common ingroup described as “the school” or “a member of the Chinese nation”. For example, “In our school, whether they are from our class or other classes, all students are part of this school. As a student of this school, I feel very happy”, “In our school, whether they are from our class or other classes, all students are part of this school. This identity is very important to me”, “Whether they are from our ethnicity or other ethnicities, all students are members of the Chinese nation. As a member of the Chinese nation, I feel very happy”, “Whether they are from our ethnicity or other ethnicities, all students are members of the Chinese nation. This identity is very important to me”. This scale consists of 4 items and is scored on a 7-point Likert scale (“1 = Strongly Disagree”, “7 = Strongly Agree”). In this study, the Cronbach's alpha coefficient of the common ingroup identity scale based on student identity was 0.66, and that based on the identity as a member of the Chinese nation was 0.78. Finally, demographic information such as age and gender was filled in.

4.3 Results

Manipulation check. A one-way ANOVA was conducted with emotion priming as the independent variable and participants' awe, positive emotions, and negative emotions as the dependent variables. The results revealed significant differences in awe among the positive awe group, the threat-based awe group, and the control group, $F(2, 217) = 25.69, p < 0.001, \eta^2 = 0.191$. Post hoc multiple comparisons showed that the positive awe group had significantly higher awe experience scores ($M = 4.69, SD = 1.35$) than the control group ($M = 3.14, SD = 1.59, p_{Bonferroni} < 0.001$, Cohen's $d = 1.05$), and the threat-based awe group also had significantly higher scores ($M = 4.62, SD = 1.46$) than the control group ($p_{Bonferroni} < 0.001$, Cohen's $d = 0.97$). However, there was no significant difference between the positive awe group and the threat-based awe group ($p_{Bonferroni} = 0.999$). There were significant differences in positive emotions among the positive awe group, the threat-based awe group, and the control group, $F(2, 217) = 27.23, p < 0.001, \eta^2 = 0.201$. The positive awe group had significantly higher scores in positive emotion experience ($M = 4.03, SD = 1.52$) than the threat-based awe group ($M = 2.14, SD = 1.68, p_{Bonferroni} < 0.001$, Cohen's $d = 1.18$) and the control group ($M = 3.27, SD = 1.50, p_{Bonferroni} = 0.012$, Cohen's $d = 0.51$). There were also significant differences in negative emotions among the positive awe group, the threat-based awe group, and the control group, $F(2, 217) = 71.54, p < 0.001, \eta^2 = 0.397$. The threat-based awe group had significantly higher scores in negative emotion experience ($M = 4.35, SD = 1.53$) than the positive awe group ($M = 2.08, SD = 1.09, p_{Tamhane}^*T2 < 0.001$, Cohen's $d = 1.69$) and the control group ($M = 2.10, SD = 1.32, p_{Tamhane}^*T2 < 0.001$, Cohen's $d = 1.57$). This indicates that the manipulation of positive awe and threat-based awe was successful.

A between-subjects ANOVA was conducted with the manipulation check of perceived resource scarcity as the dependent variable, using a 3 (positive awe vs. threat-based awe vs. control group) \times 2 (high perceived resource scarcity vs. low

Table 4
Difference Test of Different Emotions Induced by Different Awe Conditions in Study 3

Emotion	<i>F</i>	<i>p</i>	η^2	Positive awe vs Control group		Awe based on threat vs Control group		Positive awe vs Awe based on threat		Positive awe	Awe based on threat	Control group
				<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>
Happiness	32.71	<0.001	0.232	0.012	0.49	<0.001	0.81	<0.001	1.33	4.17 ± 1.55	2.07 ± 1.62	3.39 ± 1.63
Joy	19.06	<0.001	0.149	0.013	0.48	0.003	0.55	<0.001	0.97	3.90 ± 1.60	2.22 ± 1.85	3.15 ± 1.50
Fear	88.75	<0.001	0.450	0.996	0.04	<0.001	1.75	<0.001	1.81	1.99 ± 1.14	4.71 ± 1.79	1.94 ± 1.33
Anxiety	31.81	<0.001	0.227	0.999	0.05	<0.001	1.05	<0.001	1.16	2.18 ± 1.39	3.99 ± 1.71	2.25 ± 1.58

Note: *F*-test, *df* = (2, 217)

perceived resource scarcity) design. The results revealed that the main effect of awe was not significant, $F(2, 214) = 1.84$, $p = 0.162$, while the main effect of perceived resource scarcity was significant, $F(1, 214) = 45.35$, $p < 0.001$, $\eta^2 = 0.175$. The high perceived resource scarcity group ($M = 3.19$, $SD = 0.81$) perceived resources as scarcer than the low perceived resource scarcity group ($M = 2.49$, $SD = 0.73$, $\Delta M = 0.7$, $\Delta M95\% CI = [0.49, 0.90]$). The interaction effect between awe and perceived resource scarcity was not significant, $F(2, 214) = 1.83$, $p = 0.162$. This indicates that the manipulation of perceived resource scarcity was successful.

The differences in emotions induced by different conditions of awe were tested. A one-way ANOVA was conducted with awe as the independent variable and happiness, joy, fear, and anxiety as the dependent variables. The results showed that there were significant differences in happiness, joy, fear, and anxiety among the positive awe group, the threat-based awe group, and the control group (see Table 4). Therefore, in the subsequent analysis, emotions such as happiness, joy, fear, and anxiety need to be controlled.

An interaction effect between awe and perceived resource scarcity on student identity. With awe and perceived resource scarcity as independent variables, student identity as the dependent variable, and happiness, well-being, fear and anxiety as control variables, a 3 (positive awe vs. threat-based awe vs. control group) \times 2 (high perceived resource scarcity vs. low perceived resource scarcity) between-subjects analysis of variance was conducted. The results showed that the main effect of awe was significant, $F(2, 210) = 17.73$, $p < 0.001$, $\eta^2 = 0.144$. The scores of student identity of the positive awe and threat-based awe groups were significantly higher than those of the control group ($M_{\text{positive awe}} = 6.27$, $SD = 0.69$, $M_{\text{control group}} = 5.36$, $SD = 1.05$, $p < 0.001$, $\Delta M = 0.91$, $\Delta M95\% CI = [0.57, 1.15]$; $M_{\text{threat-based awe}} = 5.79$, $SD = 0.90$, $p = 0.003$, $\Delta M = 0.43$, $\Delta M95\% CI = [0.18, 0.91]$), and there was no significant difference between the positive awe group and the threat-based awe group ($p = 0.099$).

The main effect of perceived resource scarcity was significant, $F(1, 210) = 10.13$, $p = 0.002$, $\eta^2 = 0.046$. Compared with the low-perceived resource scarcity group, the scores of student identity of the high-perceived resource scarcity group were lower ($M_{\text{high perceived resource scarcity}} = 5.60$, $SD = 1.01$, $M_{\text{low perceived resource scarcity}} = 6.01$, $SD = 0.86$, $\Delta M = 0.41$, $\Delta M95\% CI = [0.14, 0.61]$).

More importantly, interaction effect between awe and awe and perceived resource scarcity is significant, $F(2, 210) = 3.68$, $p = 0.027$, $\eta^2 = 0.034$. The simple effect analysis shows that in the positive awe group, there is no significant difference in student identity between the high and low perceived resource

scarcity groups ($M_{\text{high perceived resource scarcity}} = 6.19$, $SD = 0.76$; $M_{\text{low perceived resource scarcity}} = 6.35$, $SD = 0.61$), $F(1, 210) = 0.26$, $p = 0.608$. In the control group, the difference remains insignificant ($M_{\text{high perceived resource scarcity}} = 5.25$, $SD = 1.07$; $M_{\text{low perceived resource scarcity}} = 5.47$, $SD = 1.03$), $F(1, 210) = 0.97$, $p = 0.327$. However, in the threat-based awe group, the student identity score of the high perceived resource scarcity group is significantly lower than that of the low perceived resource scarcity group ($M_{\text{high perceived resource scarcity}} = 5.38$, $SD = 0.93$; $M_{\text{low perceived resource scarcity}} = 6.22$, $SD = 0.63$), $F(1, 210) = 16.80$, $p < 0.001$, $\Delta M = 0.84$, $\Delta M95\% CI = [0.43, 1.21]$, $\eta^2 = 0.074$. (see Figure 4).

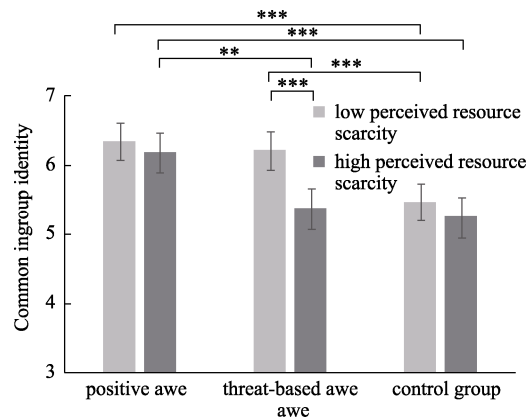


Figure 4. The Effect of Awe and Perceived Resource Scarcity on Student Identity.

The interaction between awe and perceived resource scarcity in Chinese national identity. Taking awe and perceived resource scarcity as independent variables, the common ingroup identification based on Chinese ethnicity membership as the dependent variable, and happiness, satisfaction, fear and anxiety as control variables, a 3 (positive awe vs. threat-based awe vs. control group) \times 2 (high perception of resource scarcity vs. low perception of resource scarcity) analysis of variance was conducted. The results revealed that the main effect of awe was significant, $F(2, 210) = 18.36$, $p < 0.001$, $\eta^2 = 0.149$. The common ingroup identification scores of the positive awe group and the threat-based awe group were significantly higher than those of the control group ($M_{\text{positive awe}} = 6.57$, $SD = 0.57$, $M_{\text{control group}} = 5.74$, $SD = 0.91$, $p < 0.001$, $\Delta M = 0.83$, $\Delta M95\% CI = [0.56, 1.11]$; $M_{\text{threat-based awe}} = 6.22$, $SD = 0.97$, $p = 0.039$, $\Delta M = 0.48$, $\Delta M95\% CI = [0.02, 0.70]$), and the score of the positive awe group was significantly higher than that of the threat-based awe group ($p = 0.008$, $\Delta M = 0.35$, $\Delta M95\% CI = [0.12, 0.83]$). The main effect of perceived resource scarcity

was also significant, $F(1, 210) = 6.87, p = 0.009, \eta^2 = 0.032$. Compared with the low-perceived resource scarcity group, the score of the high-perceived resource scarcity group was lower ($M_{\text{high perceived resource scarcity}} = 6.02, SD = 0.97, M_{\text{low perceived resource scarcity}} = 6.33, SD = 0.79, \Delta M = 0.31, \Delta M95\% CI = [0.07, 0.51]$).

More importantly, interaction effect between awe and perceived resource scarcity is significant, $F(2, 210) = 5.33, p = 0.006, \eta^2 = 0.048$. Simple effect analysis shows that in the positive awe group, there is no significant difference in the identification with Chinese national identity based on perceived resource scarcity ($M_{\text{high perceived resource scarcity}} = 6.54, SD = 0.63; M_{\text{low perceived resource scarcity}} = 6.60, SD = 0.52, F(1, 210) = 0.04, p = 0.839$). In the control group, the difference between high and low perceived resource scarcity is also not significant ($M_{\text{high perceived resource scarcity}} = 5.72, SD = 0.87; M_{\text{low perceived resource scarcity}} = 5.76, SD = 0.96, F(1, 210) = 0.03, p = 0.854$). However, in the threat-based awe group, the score of the high perceived resource scarcity group is significantly lower than that of the low perceived resource scarcity group ($M_{\text{high perceived resource scarcity}} = 5.82, SD = 1.13; M_{\text{low perceived resource scarcity}} = 6.64, SD = 0.50, F(1, 210) = 17.97, p < 0.001, \Delta M = 0.82, \Delta M95\% CI = [0.42, 1.17], \eta^2 = 0.079$. (see Figure 5).

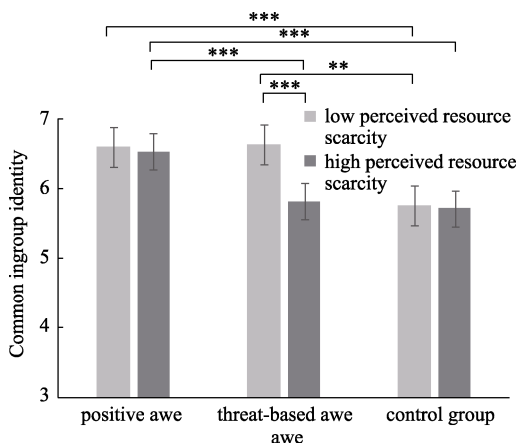


Figure 5. The Effect of Awe and Perceived Resource Scarcity on Chinese National Identity.

4.4 Discussion

The results in Study 3 are consistent with those of Study 2. Awe can promote common ingroup identity. Compared with low perceived resource scarcity, individuals with threat-based awe have lower identity with students and Chinese nation members under the condition of high perceived resource scarcity. That is, high perceived resource scarcity inhibits the promoting effect of threat-based awe on common ingroup identity. This further supports Hypothesis 1 and Hypothesis 2. However, the manipulation methods of awe and the measurement of common ingroup identity in Study 2 and Study 3 were essentially the same, and the stable results obtained might be due to the consistency of the methods. To further verify the reliability of the results, Study 4 changed the manipulation method of awe and used the score of the Chinese National Identity Scale as the measurement index of common ingroup identity to further investigate the impact of awe on common ingroup identity.

5 Study 4: The Impact of State Awe on Common Ingroup Identity: A Measurement Based on Chinese National Identity

Study 4 manipulated awe through a recall writing task and examined common ingroup identity through the Chinese National Identity Scale, with the aim of once again verifying the moderating effect of perceived resource scarcity on awe and common ingroup identity.

5.1 Method

This study employed a two-factor between-subjects design: 3 (Positive Awe vs. Threat-based Awe vs. Control Group) \times 2 (perceived resource scarcity: high vs. low). The dependent variable was measured by the score of the Chinese National Identity Scale.

This study used G*Power 3.1 (Faul et al., 2009) to estimate the sample size. Referring to the research on awe by Preston and Chin (2017), it was predicted that at a significance level of $\alpha = 0.05$ and a medium effect size ($f = 0.25$), a sample size of at least 158 participants would be required to achieve a statistical power level of 80%. The actual participants were 255 college students. After removing invalid data such as incomplete responses, responses with extremely short completion times, and regular responses, 220 valid responses were obtained (72 males and 148 females; 175 Han and 45 from Minority). The actual statistical power level was 91.97%. The participants' age was 19.46 ± 4.75 years. The sensitivity analysis results indicated that this sample size provided 80% power to detect an effect size of $f = 0.21$ or larger at a 5% false positive rate. Among them, there were 39 participants in the positive awe - high perceived resource scarcity group, 36 in the positive awe - low perceived resource scarcity group; 36 in the threat-based awe - high perceived resource scarcity group, 35 in the threat-based awe - low perceived resource scarcity group; 36 in the control group - high perceived resource scarcity group, and 38 in the control group - low perceived resource scarcity group. All participants voluntarily participated in the experiment, had normal vision or corrected vision, and no cognitive impairments. They signed the informed consent form before the experiment and received certain remuneration after the experiment.

5.2 Procedure and Materials

First, the recall writing paradigm was used to manipulate awe (Gordon et al., 2017). Participants were assigned to the positive awe, threat-based awe, and control groups and were asked to read the following content. Positive Awe Manipulation of Materials: "Awe is a powerful emotion that evokes both respect and fear. Typically, we experience awe when confronted with vast and beautiful landscapes or natural wonders, such as towering mountains, expansive vistas, or majestic waterfalls. We also feel awe for individuals who bring about significant change, like Nelson Mandela and his role in ending racial division in South Africa." Threat-based awe manipulation materials: "Awe is a powerful feeling of both respect and fear. Usually, we feel awe towards natural disasters such as earthquakes, hurricanes or volcanic eruptions. We also feel awe towards those who cause large-scale destruction, such as Hitler and the immense terror he brought about during World War II." The participants in the control group read materials related to daily life. After reading, the participants in the positive awe and threat-based awe groups were asked to recall previous awe experiences similar to the instructions, while the control group participants were asked to recall what happened from morning

till night today and describe it in at least five sentences. After completing the recall writing task, the participants filled out the self-report emotion scale (the same as in Study 2), with the correlation coefficients being 0.57, 0.67, and 0.50 respectively.

Secondly, the manipulation of perceived resource scarcity and the manipulation check (as in Study 2) were conducted. The internal consistency coefficient of the perceived resource scarcity questionnaire was 0.81.

Thirdly, participants completed the Chinese National Identity Scale (Phinney & Ong, 2007), with the term “ethnicity” changed to “Chinese nation”, such as “I have a strong sense of belonging to the Chinese nation”. The scale consists of two dimensions, exploration and commitment, with six items, scored on a 6-point scale (1 = completely disagree, 6 = completely agree). The higher the score, the deeper the degree of Chinese national identity. In this study, the internal consistency coefficient of the questionnaire was 0.73. Finally, demographic information such as age, gender, and ethnicity was filled in.

5.3 Results

Manipulation Check. A one-way ANOVA was conducted with emotion priming as the independent variable and participants' awe, positive emotions, and negative emotions as the dependent variables. The results revealed significant differences in awe among the positive awe group, the threat-based awe group, and the control group, $F(2, 217) = 18.27, p < 0.001, \eta^2 = 0.144$. Post hoc multiple comparisons showed that the positive awe group had significantly higher awe experience scores ($M = 4.09, SD = 1.33$) than the control group ($M = 3.11, SD = 1.10, p_{Bonferroni} < 0.001, Cohen's d = 0.80$), and the threat-based awe group ($M = 4.22, SD = 1.21$) also had significantly higher scores than the control group ($p_{Bonferroni} < 0.001, Cohen's d = 0.96$). However, there was no significant difference between the positive awe group and the threat-based awe group ($p_{Bonferroni} = 0.999$). There were significant differences in positive emotions among the positive awe group, the threat-based awe group, and the control group, $F(2, 217) = 7.38, p < 0.001, \eta^2 = 0.064$. The positive awe group had significantly higher scores in positive emotion experience ($M = 4.39, SD = 1.34$) than the threat-based awe group ($M = 3.61, SD = 1.58, p_{Tamhane}T2 = 0.005, Cohen's d = 0.56$) and the control group ($M = 3.68, SD = 1.16, p_{Tamhane}T2 = 0.002, Cohen's d = 0.57$). There were also significant differences in negative emotions among the positive awe group, the threat-based awe group, and the control group, $F(2, 217) = 16.82, p < 0.001, \eta^2 = 0.134$. The threat-based awe group had significantly higher scores in negative emotion experience ($M = 4.02, SD = 1.11$) than the positive awe group ($M = 3.21, SD = 1.22, p_{Bonferroni} < 0.001, Cohen's d = 0.69$) and the control group ($M = 2.97, SD = 1.09, p_{Bonferroni} < 0.001, Cohen's d = 0.95$). This indicates that the manipulation of positive awe

and threat-based awe was successful.

A between-subjects ANOVA was conducted with the manipulation check of perceived resource scarcity as the dependent variable, using a 3 (positive awe vs. threat-based awe vs. control group) \times 2 (high perceived resource scarcity vs. low perceived resource scarcity) design. The results revealed that the main effect of awe was not significant, $F(2, 214) = 0.72, p = 0.488$, while the main effect of perceived resource scarcity was significant, $F(1, 214) = 42.39, p < 0.001, \eta^2 = 0.165$. The high perceived resource scarcity group ($M = 3.33, SD = 0.71$) perceived resources as scarcer than the low perceived resource scarcity group ($M = 2.71, SD = 0.72, \Delta M = 0.62, \Delta M95\% CI = [0.44, 0.82]$). The interaction effect between awe and perceived resource scarcity was not significant, $F(2, 214) = 2.09, p = 0.127$. This indicates that the manipulation of perceived resource scarcity was successful.

The differences in emotions induced by different awe conditions were tested. A one-way ANOVA was conducted with awe as the independent variable and happiness, joy, fear, and anxiety as the dependent variables. The results showed that there were significant differences in happiness, joy, fear, and anxiety among the positive awe group, the threat-based awe group, and the control group (see Table 5). Therefore, emotions such as happiness, joy, fear, and anxiety need to be controlled in subsequent analyses.

The interaction Effect between awe and perceived resource scarcity. A between-subjects analysis of variance was conducted with awe (positive awe vs. threat-based awe vs. control group) and perceived resource scarcity (high vs. low) as independent variables, Chinese national identity as the dependent variable, and happiness, well-being, fear, and anxiety as control variables. The results revealed that the main effect of awe was significant, $F(2, 210) = 5.76, p = 0.004, \eta^2 = 0.052$. The scores of Chinese national identity of the positive awe group and the threat-based awe group were significantly higher than those of the control group ($M_{positive awe} = 4.79, SD = 0.58, M_{control group} = 4.46, SD = 0.45, p < 0.001, \Delta M = 0.33, \Delta M95\% CI = [0.12, 0.47]$). There was no significant difference in the scores of Chinese national identity between the threat-based awe group and the control group, $M_{threat-based awe} = 4.56, SD = 0.65, p = 0.243$. Moreover, the scores of Chinese national identity of the positive awe group and the threat-based awe group were marginally significant ($p = 0.051$). The main effect of perceived resource scarcity was significant, $F(1, 210) = 20.97, p < 0.001, \eta^2 = 0.091$. Compared with the low perceived resource scarcity group, the scores of Chinese national identity of the high perceived resource scarcity group were lower ($M_{high perceived resource scarcity} = 4.46, SD = 0.55, M_{low perceived resource scarcity} = 4.75, SD = 0.57, \Delta M = 0.29, \Delta M95\% CI = [0.19, 0.47]$).

Table 5
Results of the Difference Test of Different Emotions Induced by Different Awe Conditions in Study 4

Emotion	Positive awe vs Control group			Awe based on threat vs Control group		Positive awe vs Awe based on threat		Positive awe	Awe based on threat	Control group		
	<i>F</i>	<i>p</i>	η^2	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>					
Happiness	7.64	<0.001	0.066	0.001	0.60	0.989	0.05	0.005	0.54	4.41 \pm 1.38	3.55 \pm 1.80	3.62 \pm 1.26
Joy	4.74	0.010	0.042	0.019	0.46	0.991	0.05	0.034	0.43	4.36 \pm 1.51	3.66 \pm 1.76	3.73 \pm 1.25
Fear	23.25	<0.001	0.176	0.186	0.32	<0.001	1.09	<0.001	0.77	2.89 \pm 1.21	3.87 \pm 1.33	2.51 \pm 1.16
Anxiety	5.53	0.005	0.048	0.999	0.07	0.007	0.53	0.025	0.45	3.52 \pm 1.56	4.17 \pm 1.33	3.42 \pm 1.50

Note. *F*-test, *df* = (2, 217)

Crucially, the interaction effect between awe and perceived resource scarcity is significant, $F(2, 210) = 10.30$, $p < 0.001$, $\eta^2 = 0.089$. Simple effect analysis shows that in the positive awe group, there is no significant difference in the sense of Chinese national identity based on perceived resource scarcity ($M_{\text{high perceived resource scarcity}} = 4.71$, $SD = 0.55$; $M_{\text{low perceived resource scarcity}} = 4.88$, $SD = 0.61$), $F(1, 210) = 1.78$, $p = 0.183$. The same is true for the control group ($M_{\text{high perceived resource scarcity}} = 4.45$, $SD = 0.36$; $M_{\text{low perceived resource scarcity}} = 4.47$, $SD = 0.52$), $F(1, 210) = 0.08$, $p = 0.780$. However, in the threat-based awe group, the score of Chinese national identity in the high perceived resource scarcity group is significantly lower than that in the low perceived resource scarcity group ($M_{\text{high perceived resource scarcity}} = 4.20$, $SD = 0.60$; $M_{\text{low perceived resource scarcity}} = 4.93$, $SD = 0.48$), $F(1, 210) = 37.10$, $p < 0.001$, $\Delta M = 0.73$, $\Delta M95\% \text{ CI} = [0.53, 1.04]$, $\eta^2 = 0.150$ (see Figure 6).

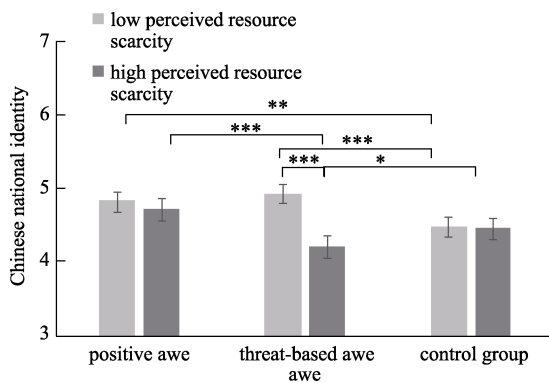


Figure 6. The Effect of Awe and Perceived Resource Scarcity on Chinese National Identity.

5.4 Discussion

Study 4 altered the manipulation method of awe and utilized the Chinese National Identity Scale to examine the common ingroup identity. The results were consistent with those of Studies 2 and 3.

6 General Discussion

We explored the impact of awe and perceived resource scarcity on common ingroup identity through four studies. Study 1 examined the relationship among trait awe, perceived resource scarcity, and common ingroup identity using questionnaires. Studies 2 to 4 further investigated the effects of situational awe and perceived resource scarcity on common ingroup identity by manipulating these variables and employing different measurement methods for common ingroup identity. Regarding trait awe, the results showed that it positively predicted common ingroup identity, and perceived resource scarcity played a moderating role in this relationship. Specifically, a high level of perceived resource scarcity attenuated the facilitative effect of trait awe on common ingroup identity. Regarding situational awe, under conditions of high perceived resource scarcity, only positive awe promoted common ingroup identity, whereas under conditions of low perceived resource scarcity, both positive awe and threat-based awe promoted common ingroup identity.

6.1 Theoretical and Practical Implications

First, this study demonstrates the facilitative effect of awe on common ingroup identity, thereby providing empirical sup-

port for the Common Ingroup Identity Model. The Common Ingroup Identity Model proposes that intergroup interdependence, group differentiation, environmental context, and precontact experience influence individuals' cognitive representations of membership affiliations (Gaertner et al., 1993). Within precontact experiences, emotional priming influences recategorization (Gaertner et al., 1993). For instance, shared emotional responses to common events enhance the categorization of the self as a group member (van Kleef & Fischer, 2016). This finding is also supported by previous research (Seo et al., 2023).

Study 3 indicated that, concerning the Chinese national identity and student identity, both positive awe and threat-based awe promoted a common ingroup identity, which supports Hypothesis 1. Furthermore, divergent patterns emerged between positive awe and threat-based awe concerning Chinese national identity and student identity. Specifically, for the Chinese national identity, positive awe was significantly higher than threat-based awe, whereas no significant difference was observed between the two types of awe in relation to student identity. This maybe because when experiencing threat-based awe, such as in response to floods, earthquakes, or hurricanes, individuals tend to establish connections with more powerful groups to obtain a sense of belonging and security.

Second, the finding that awe fosters common ingroup identity provides a more direct and effective explanation for how awe promotes intergroup relations. Previous research on the impact of awe on intergroup relations primarily focused on how awe reduced stereotypes by enhancing connectedness (Luo et al., 2022) or increases prosocial behavior (Vingerhoets et al., 2016), with scant attention paid to the mechanism of changing group identity representations. In contrast, this study examines the facilitative effect of awe on common ingroup identity. By constructing a superordinate identity, common ingroup identity re-categorizes original outgroup members as ingroup members. This process not only reduces outgroup bias but can also enhance ingroup favoritism, thereby promoting intergroup relations in a more direct and effective manner.

Third, this study elucidates the specific conditions under which awe more effectively promotes common ingroup identity, thereby contributing to a deeper understanding of how awe facilitates intergroup relations and offering valuable insights for addressing crises. Study 1 found that high perceived resource scarcity buffered the impact of trait awe on common ingroup identity. Studies 2 to 4 further revealed that under conditions of positive awe, there was no difference in common ingroup identity between high and low perceived resource scarcity conditions; however, high perceived resource scarcity inhibited the facilitative effect of threat-based awe on common ingroup identity. This finding is also supported by prior research (Miao et al., 2023). For instance, Miao et al. (2023) found that under conditions of low common threat, there was no difference in intergroup cooperation between groups with high versus low perceived resource scarcity. However, high perceived resource scarcity attenuated the facilitative effect of common threat on intergroup cooperation. According to the Common Ingroup Identity Model, intergroup cooperation promotes common ingroup identity (Gaertner et al., 1993). This pattern is also consistent with observed attitude shifts during the pandemic: in the initial stage, the public generally complied with home confinement, but after a period of isolation, as people perceived

increasing life inconveniences and resource scarcity, attitudes toward confinement became more negative.

Perceived resource scarcity only moderated the relationship between threat-based awe and common ingroup identity. This may be because the manipulation of perceived resource scarcity was unrelated to the priming materials used for positive awe. In Studies 2 to 4, perceived resource scarcity was manipulated by having participants perceive a scarcity of survival resources within a pandemic context. Studies 2 and 3 induced positive awe by having participants watch videos of spectacular natural scenery, while Study 4 induced positive awe through the recall of majestic natural landscapes. Since natural scenery is unrelated to the perceived scarcity of survival resources, this explains the specific moderating effect observed. Therefore, under the condition of positive awe, the common ingroup identity score of participants in the high perceived resource scarcity group was lower than that of the low perceived resource scarcity group, but the difference was not significant. However, since the perceived scarcity of survival resources is associated with threats from earthquakes, floods, and hurricanes, the induction of threat-based awe under conditions of high perceived resource scarcity—particularly amidst the recent COVID-19 pandemic—rendered the participants' experience more vivid and authentic. This heightened focus on immediate resource scarcity and personal interests, thereby diminishing the self-transcendence and smallness typically evoked by awe and ultimately impeding awe's facilitative effect on common ingroup identity.

Fourth, although certain contexts that elicit perceived resource scarcity, such as a pandemic, may also trigger threat-based awe, a fundamental distinction exists between perceived resource scarcity and threat-based awe. Threat-based awe refers to an intense emotional experience characterized by fear and wonder when an individual confronts a formidable stimulus (Gordon et al., 2017; Li et al., 2024; Zhao et al., 2023). In contrast, perceived resource scarcity denotes a subjective feeling that one's available resources are insufficient to meet existing needs or demands (Mullainathan & Shafir, 2013). When viewing videos of floods, earthquakes, and hurricanes, individuals may perceive a threat and experience emotions such as fear and awe, but they do not necessarily perceive a supply-demand imbalance of resources. This indicates that a sense of resource scarcity is not invariably evoked. Existing research has found that perceived resource scarcity can moderate the relationship between earthquake-induced common threat and intergroup cooperation (Miao et al., 2023), which indirectly supports the notion that perceived resource scarcity and threat-based awe are distinct constructs. Furthermore, in the manipulation checks for perceived resource scarcity across Studies 2 to 4, with perceived resource scarcity as the dependent variable, the main effect of awe was not significant, nor was the interaction effect between awe and perceived resource scarcity. This further demonstrates that threat-based awe did not induce perceived resource scarcity in the present study.

Fifth, the conceptualization of threat-based awe encompasses variants of awe and mixed emotions (Chaudhury et al., 2022; Gordon et al., 2017; Keltner & Haidt, 2003). Keltner and Haidt (2003) proposed that the characteristics of awe-eliciting stimuli may lead to different variants of awe. For example, awe triggered by individuals demonstrating exceptional ability contains admiration and falls under positive awe, whereas awe

evoked by hurricanes, earthquakes, or floods contains fear and belongs to negative awe. Recent research posits that threat-based awe constitutes a mixed emotion comprising both positive and negative components (Chaudhury et al., 2022). Chaudhury et al. (2022) found that threat-based awe is, to some extent, perceived as a blend of awe and fear. The present study demonstrates that regardless of whether threat-based awe is conceptualized as a negative variant of awe or as a mixed emotion, it can promote common ingroup identity, with perceived resource scarcity serving a moderating role.

This may be because fear can evoke a sense of vastness, which in turn diminishes the self (Vasey et al., 2012)—a mechanism consistent with the self-diminishment hypothesis of awe (Jiang et al., 2024; Seo et al., 2023). The resulting “small selfness” motivates individuals to integrate into social collectives (Chen & Boucher, 2008) and enhances a sense of unity with others to fulfill belongingness needs (Vaughn & Fredrickson, 2006), thereby alleviating feelings of loneliness and helplessness (Stellar et al., 2017). However, under conditions of high perceived resource scarcity, fear tends to trigger a series of self-preservation behaviors aimed at coping with threats (Öhman, 2008), leading individuals to focus more on their own needs and consequently attenuating the sense of small self.

Sixth, this study demonstrates that awe promotes common ingroup identity. This suggests that in educational practice, teachers should inspire students' awe toward Chinese culture, natural wonders, historical events, and the national spirit of the Chinese nation. By enabling students to fully appreciate the nation's vast territory, inclusive and profound culture, global-mindedness, and persevering national character, we can enhance their cultural confidence and thereby strengthen their identification with the common ingroup—the Chinese nation. At the same time, awe should also be evoked by presenting magnificent natural landscapes and diverse cultures of different countries and ethnic groups to foster a sense of identity with the community with a shared future for mankind. This will help cultivate students' global responsibility and prosocial behavior, enhance cooperation, and improve their capacity to respond to risks.

Furthermore, the study found that high perceived resource scarcity inhibited the facilitative effect of awe on common ingroup identity, particularly for threat-based awe. This finding implies that in resource-constrained social environments, especially when facing floods, tsunamis, and pandemics, organizational managers should pay attention to the fairness of resource distribution to avoid intergroup competition and low common ingroup identity caused by unequal resource possession.

6.2 Limitation and Research Directions

First, this study was limited to measuring common ingroup identity at the explicit level using only two superordinate identities - “student” and “Chinese national identity”. This approach is relatively narrow in scope, fails to capture common ingroup identity at the behavioral level, and the “student” identity examined has a weak connection to the awe induction. Furthermore, the measurement of explicit Chinese national identity may also be subject to social desirability bias. Future research could, on the one hand, employ more diverse methods to measure common ingroup identity, such as social distance, relational closeness, and feeling thermometers (Zhu et al., 2024). It could also examine different common ingroup identities, for instance, citizen identity, national identity, and provincial or city identity.

On the other hand, future studies could utilize the Implicit Association Test (IAT) or the Go/No-go Association Task (GNAT) to measure implicit common ingroup identity, or adopt measurements of prosocial behaviors like resource distribution to investigate common ingroup identity at the behavioral level.

Second, the participants in this study were limited to university students, and thus the research did not explore the relationship between awe and common ingroup identity in adolescents. Li et al. (2024) suggest that adolescents typically exhibit higher levels of egocentrism, focusing more on themselves and less on the external world. This raises a pertinent question: does awe also promote common ingroup identity within adolescent populations? Future research could specifically employ adolescent samples to further investigate the relationship between awe and common ingroup identity.

Third, the relationship between awe and common ingroup identity may be moderated by variables other than perceived resource scarcity, such as cultural background. For instance, collectivist cultures emphasize group harmony, whereas individualistic cultures prioritize personal experiences; this cultural orientation may influence how awe affects common ingroup identity. Future research could further investigate such moderating factors to provide a more comprehensive understanding of the impact of awe on common ingroup identity.

Fourth, this study manipulated perceived resource scarcity within a pandemic context by having participants perceive a shortage of survival resources, and induced positive awe using videos of natural landscapes. However, the scarcity of medical resources in a pandemic context is not closely associated with natural landscapes, which may explain why perceived resource scarcity did not exert a moderating role in the condition of positive awe. Furthermore, manipulating perceived resource scarcity within a pandemic context by emphasizing scarce medical resources may inadvertently elicit threat-based awe. Consequently, future research could substitute the manipulation materials for perceived resource scarcity with scenarios depicting the scarcity of natural resources, such as the disappearance of natural landscapes due to global warming, to further investigate the moderating role of perceived resource scarcity.

6 Conclusion

Research primarily yielded the following conclusions: First, awe promotes common ingroup identity. Second, perceived resource scarcity moderates the facilitative effect of awe on common ingroup identity; specifically, high perceived resource scarcity weakens the promotive effect of trait awe on common ingroup identity and inhibits the facilitative effect of threat-based awe on common ingroup identity.

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