

The Association Between Group Identity and Post-Traumatic Growth in the Post COVID-19 Era: The Mediating Effect of Social-Emotional Competence

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Purpose: To investigate the impact of human-society relationships on individual post-traumatic growth (PTG) in the post COVID-19 era, this study examined the association between group identity (GI) and PTG, and explored the mediating role of social-emotional competence (SEC).

Patients and Methods: In this cross-sectional study, we surveyed 1203 high school students in an eastern region of China using the GI Scale, the SEC Scale, and the PTG Scale. We conducted correlation and mediation analyses using SPSS 23.0 and PROCESS software.

Results: The results indicated that GI was a significant positive predictor of PTG ($\beta=0.219$, $p<0.001$), and that the pathway between GI and PTG was partially mediated by SEC (Effect=0.074, 95% CI= [0.045,0.104]).

Conclusion: GI can have both direct and indirect effects on PTG, with the latter mediated by SEC. These findings hold important theoretical and practical implications for promoting PTG and enhancing mental health in the post COVID-19 era.

Keywords: COVID-19, human-society relationship, mental health, mediation model

Introduction

Numerous studies have reported that the COVID-19 pandemic has had detrimental effects on individuals' mental health, leading to symptoms such as anxiety, depression, and post-traumatic stress disorder (PTSD).^{1,2} Adolescents and college students have been particularly affected, experiencing problems such as sadness, irritability, and insomnia.^{3,4} Given that the mental health impact of the pandemic may persist for years to come,⁵ it is critical to explore ways to help the public cope with the psychological trauma of COVID-19 and promote post-traumatic growth (PTG) in the post COVID-19 era.⁶⁻⁸ PTG refers to the positive psychological changes that can occur in individuals in the face of adversity or other challenges, such as increased appreciation for life, greater personal resilience and self-awareness, closer relationships with others, and deeper personal experiences.⁹ A review of the literature has found that PTG is associated with individuals' psychological emotions, rumination, positive coping strategies, and behaviors.¹⁰ Moreover, multiple studies have shown that PTG during the COVID-19 is related to expectations of life, social and collective connectedness, and psychological well-being.¹¹⁻¹³

A number of factors influence an individual's PTG, including both internal factors, such as gender, age, personality traits, and coping styles,¹⁴⁻¹⁶ and external factors, such as family socioeconomic status (SES), type of trauma, and social support.¹⁷⁻¹⁹ Additionally, group identity (GI) is recognized as a significant factor in shaping an individual's PTG.²⁰ GI is an affective phenomenon denoting the emotional bond and sense of identification experienced by individuals toward

a particular group, which is predicated on shared characteristics or experiences, ultimately resulting in a heightened sense of affiliation and connectedness to the group.²¹ While few studies have explored the relationship between GI and PTG, existing research has revealed a strong association between the two. For instance, a study showed that traditional perceptions hindered emotional connection to the group, leading to negative emotions that impeded PTG.²² Henson et al²³ found that attachment avoidance among some university faculty and students hindered their PTG.

Recently, there has been growing interest in the role of social-emotional competence (SEC) in regulating cognitive and psychological processes.^{24,25} SEC is defined as an individual's ability to perceive and express emotions, as well as to understand and use emotions in various situations. Moreover, there is a strong link between emotion perception, reasoning, and emotion management.²⁶ SEC is also an important factor in promoting PTG. Tang et al²⁷ compared the emotional competence of COVID-19 adolescents during and after isolation and found that increased SEC can facilitate PTG in adolescents. Furthermore, several researches indicate a positive correlation between SEC and GI.^{28,29} For instance, a study showed that a strong GI is associated with a greater sense of well-being, which, in turn, enhances individual SEC.³⁰ Similarly, community volunteers revealed that participation in community service enhanced their sense of belonging, support, and well-being, thereby promoting the development of individual SEC.³¹ Despite the intrinsic link between these factors, the mediating role of SEC in this relationship has been underexplored in the literature.

Therefore, in the post COVID-19 era, it is crucial to investigate how human-society relationships can help people cope with the psychological trauma of COVID-19 and promote PTG. To this end, we conducted a survey of high school students who experienced COVID-19 to explore the relationship between GI and PTG, as well as the mediating role of SEC. Our study provides valuable insights into adolescent mental health and informs targeted psychological interventions to support those affected by the pandemic.

Theoretical Basis and Hypothesis

Relationship Between GI and PTG

Since the 1970s, the concept of social identity and the theory of social identity³² have been introduced, leading to the gradual development of the concept of GI^{33–35} by many scholars. According to Tajfel,³⁴ GI refers to an individual's perception of their connections to others based on shared social, cultural, or identity characteristics, and he emphasizes the importance of common ties between individuals and groups. GI can also be defined as the emotional connection and identification between an individual and a specific group, emphasizing the significance of emotions and identity.³³ Harris³⁶ argues that adolescents are expected to assign themselves to "peer groups" outside of their families, and in the process, their own behavior is conditioned and influenced by the rules and culture of their peer groups. This coincides with the adolescent groups or classroom groups in which the high school students in this study were enrolled. The GI in this study refers to the emotional connections and behaviors of high school students in "peer groups" or "classroom groups", which are conditioned and influenced by the rules and culture of these groups. Currently, GI has been widely recognized as a key concept in understanding psychological, sociological, anthropological, and political phenomena. It has been used to explain various social phenomena such as discrimination, ethnic conflicts,³⁷ political movements,³⁸ team effects³⁹ and so on.

PTG refers to the positive changes and developments in an individual's psyche following a traumatic event, such as bereavement, serious illness, war, natural disaster, etc., which are achieved through positive coping and adaptation. These positive changes may include a greater appreciation of life, heightened individual awareness and competence, improved connections with others, the emergence of new possibilities, and a sense of spirituality and existence.⁹ Although the concept of PTG emerged relatively recently,⁴⁰ research on it has grown rapidly, producing a large number of studies examining the psychological changes individuals experience after traumatic events.⁴¹ PTG is a multidimensional and unique phenomenon, and the factors that influence it are diverse.⁴² They can be divided into two categories: internal and external factors. For instance, social science variables, such as gender and age, as well as SES and the type of traumatic event, have been found to be related to PTG.^{14,17} Additionally, Blom et al⁴³ found that personality traits, perceived abilities, and coping styles in the face of trauma from COVID-19 also influence PTG. Capaldi et al⁴⁴ and Waters et al⁴⁵

have also found that changes in the environment, such as school, workplace, and community, as well as the support provided by society during COVID-19, can affect individuals' PTG.

Based on a review of the literature on GI and PTG, we have identified a potential link between these two constructs. Social identity theory posits that humans develop a sense of belonging to groups through social interactions, and this GI can influence their behavior and emotions.³⁵ For example, Ntontis et al⁴⁶ found that during the COVID-19 pandemic, GI can help individuals recover and enhance their sense of well-being and value, which in turn may help them cope with trauma and stress. Research also suggests that mobilizing individuals to participate in group activities and associate with their social groups during COVID-19 can promote pro-social behaviors and psychological well-being.⁴⁷ According to Fredrickson's broaden-and-build theory,⁴⁸ positive behaviors and emotions play a key role in helping individuals alleviate stress and promote PTG. Positive changes in social, emotional, and coping styles can also contribute to individual PTG.⁴⁹ Therefore, individuals with a strong sense of GI may be more likely to exhibit positive behaviors and emotions, providing a foundation for PTG.⁵⁰ Mo et al⁵¹ found that individuals with strong GI and positive coping styles during COVID-19 were more likely to experience PTG. Finally, one study suggested that intervening in the connection between adolescents and their social groups can help alleviate trauma and promote PTG, particularly among those affected by the COVID-19 pandemic.⁵² Overall, we hypothesize that GI is positively associated with PTG:

H1: GI is positively correlated with PTG.

The Mediating Role of SEC

SEC refers to the cognitive and behavioral ability to manage one's own emotions, understand the emotions of others, and navigate social relationships.²⁶ The CASEL organization in the United States defines SEC as encompassing five key skills related to the development of cognitive, emotional, and behavioral abilities: self-awareness, self-management, social awareness, interpersonal skills, and responsible decision-making.⁵³ Existing research indicates that SEC is highly beneficial to individuals, enabling them to adapt better to school and social life, enhance academic performance, develop essential survival skills, and promote positive psychological and behavioral outcomes.^{54,55} A recent Polish study investigating mental health during the COVID-19 pandemic demonstrated that a positive correlation exists between individuals' SEC and mental health status, with those possessing higher SEC experiencing lower levels of emotions such as fear, sadness, and anxiety.⁵⁶

Researchers have been investigating the factors that impact SEC. Internal factors, such as gender, age,⁵⁷ and temperament have been shown to be important. Piqueras et al⁵⁸ demonstrated that gender and age are variables that modulate SEC. Brophy-Herb et al⁵⁹ suggested that girls may show greater self-regulation and social competence than boys, and that people with challenging temperaments and personalities are more sensitive to emotional perceptions, thus influencing their SEC. On the other hand, external factors, such as SES, social support, environment, and policies^{57,60,61} have also been shown to be influential. Rivas-Drake et al⁶² found that a positive classroom atmosphere and environment can enhance SEC. Brunsting et al⁶³ showed that social support and environmental changes can have a significant moderating effect on students' SEC. GI is another potential factor that may impact SEC. Although the literature suggests that SEC influences relationships, sociality, and GI,⁶⁴ it is generally accepted that GI has a critical influence in adolescent SEC.^{29,65,66} Social cognitive theory suggests that individuals construct social connections that influence their emotional and social behaviors.⁶⁷ Perceptions, such as feelings of value, belonging, and self-efficacy, are thought to be central to influencing SEC.⁶⁸ Thus, GI may facilitate or hinder individual SEC by influencing perceptions. Brändle et al²⁸ found that strong GI is associated with high levels of self-efficacy, which facilitates the development of SEC. Moreover, a study of people's mental health surveys during the COVID-19 pandemic found that individuals with high GI had stronger psychological well-being and sense of worth, which was associated with better development of SEC.⁶⁹ Based on these findings, we predict a positive correlation between GI and SEC.

The COVID-19 pandemic has resulted in an increasing body of research investigating the relationship between SEC and mental health. Sun⁷⁰ found that children with high levels of SEC exhibited fewer psychological and behavioral problems.⁷¹ Similarly, Soto-Rubio et al found that increased SEC can help individuals improve their self-efficacy, job satisfaction, and mental health. Emotional intelligence theory suggests that an individual's emotional intelligence may be

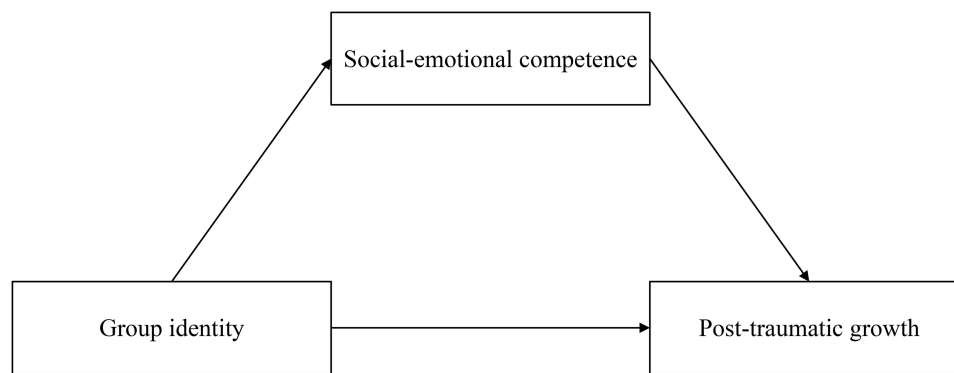


Figure 1 The relationships examined in the study.

reflected in their performance in four key areas, namely emotion recognition, understanding, expression, and regulation. It elucidates the moderating influence of SEC on human psychology.²⁶ Positive psychological regulation can effectively promote PTG.⁷² Thomas et al⁷³ concluded that an individual's SEC is one of the factors that affect PTG, and high SEC can enhance post-traumatic adaptive functioning and foster PTG. Li et al⁷⁴ explored the adaptive capacity and strategies of college students during COVID-19 and found that individuals with high SEC demonstrated better cognitive, emotional regulation, and behavioral coping strategies, thereby enhancing their adaptive capacity and improving their ability to confront adversity.

Upon reviewing the literature, we contend that GI exerts a significant influence on PTG, and have identified a positive correlation between SEC, GI, and PTG. On this basis, we propose the following hypothesis:

H2: SEC mediates the relationship between GI and PTG.

The study model is presented in [Figure 1](#):

Materials and Methods

Participants and Procedures

For this study, the participants of this study were high school students who had been impacted by the COVID-19 pandemic, aged between 16 to 18, and from the eastern region of China. A total of 1250 students were selected as the subjects. Paper-based questionnaires were distributed to the selected participants, which was distributed between October and November 2022, just after the area surveyed had experienced a blockade caused by the COVID-19. Prior to completing the questionnaire, the researcher provided an explanation of the study and questionnaire details to the participating students. With the permission of the parents, classroom teachers, and students themselves, the questionnaires were distributed and the respondents were instructed to complete them truthfully. Finally, the questionnaires were collected and the data were entered.

Upon completion of data collection, the researcher evaluated the validity of the questionnaires, and after invalid questionnaires with overly regular or missing answers were eliminated, 1203 valid questionnaires were recovered, with a valid recovery rate of 96.24%. Of the 1203 respondents, 659 (54.78%) were male and 544 (45.22%) were female. In terms of place of residence, 709 (58.94%) were urban and 494 (41.06%) were rural.

Materials

The survey instrument employed in this study was comprised of four sections: a demographic information questionnaire, a GI scale, a PTG scale, and a SEC scale. The demographic information questionnaire requested information on gender, residential location, and SES of the respondents. With the exception of the demographic information questionnaire, the remaining three scales were originally developed in English. To ensure the quality and accuracy of the scales, we utilized the back translation method for translation.⁷⁵

GI Scale

The GI Scale was used to assess GI using the Group Differences in Industrial Organizations scale developed by Brown et al.⁷⁶ To ensure quality and validity, the final questionnaire consisted of five items. In this scale, high school students are asked a series of five questions that assessed the strength of their group identity with their peer groups and classroom groups. Examples of the items include “Do you consider this group important?”, “Do you identify with this group?”, “Do you feel a sense of belonging to this group?” and “Do you have a strong sense of community in this group?” These questions were highly correlated with the assessment of GI. The questionnaire was scored on a 5-point Likert scale, ranging from 1 (never identify) to 5 (always identify), and all questions were scored positively except for one item which was scored negatively. In this study, the results of the validation factor analysis showed that the one-way model fit data were satisfactory: $\chi^2/df = 0.029$, CFI = 1.000, TLI = 1.003, RMSEA = 0.000, SRMR = 0.002, and Cronbach’s alpha coefficient was 0.701.

SEC Scale

The SEC Scale was used to assess the sample, using the SEC Scale developed by Mantz.⁷⁷ The scale consisted of 12 questions, organized into four dimensions: responsible decision-making, interpersonal skills, self-management, and social awareness. For example, “I feel responsible for my actions” (responsible decision-making), “I think twice before acting” (interpersonal skills), “What others think is important to me” (social awareness), and “I get along well with others” (interpersonal skills), among others. The questionnaire was scored on a 7-point Likert scale, ranging from 1 (very non-conforming) to 7 (very conforming), with higher scores indicating greater levels of pro-social behavior among students. In this study, the results of the validation factor analysis showed that the one-way model fit data were satisfactory: $\chi^2/df = 2.921$, CFI = 0.987, TLI = 0.982, RMSEA = 0.040, SRMR = 0.022; Cronbach’s alpha coefficient was 0.890.

PTG Scale

The PTG Inventory (PTGI) used in this study was adapted from the original scale developed by Cann A et al.⁷⁸ The scale was adapted due to the differences between cultures and the level of cognitive development of adolescents. The final version of the questionnaire comprised four dimensions: Relating to Others, New Possibilities, Personal Strength, and Appreciation of Life. It included a total of eight questions, such as “I have a sense of relating to others”, “I can do better things with my life” (New Possibilities), “I know I can cope with difficulties” (Personal Strength), and “I have a greater appreciation of the value of my life” (Appreciation of Life). The questionnaire was scored on a 6-point Likert scale ranging from 0 (I did not experience this change as a result of my crisis) to 5 (I experienced this change in large part due to my crisis), with higher scores indicating greater levels of PTG among the participants. Results of the validated factor analysis showed satisfactory data for the one-way model fit: $\chi^2/df = 2.950$, CFI = 0.992, TLI = 0.981, RMSEA = 0.040, SRMR = 0.036; Cronbach’s alpha coefficient was 0.960.

Control Variables

Based on prior research suggesting that an individual’s gender, place of residence, and SES may be associated with PTG,¹⁴ we included these aspects as control variables.

Data Analysis

The statistical software SPSS 23.0 and AMOS were used to analyze the data in this study. First, to ensure the validity of the data analysis, SPSS 23.0 was used to perform the Harman’s single-factor test method to check for common method bias.^{79,80} Also, SPSS 23.0 was used for descriptive statistics and Pearson correlation analysis. Next, the validity of the measurement model was verified with the help of AMOS to construct the SEM. Meanwhile, SPSS PROCESS macro was used to test the study hypotheses. In addition, We tested the hypothesis model by the bootstrap method (N=5000) with GI as the independent variable, PTG as the dependent variable, SEC as the mediating variable, and gender, residential location, and SES as the control variables.

Results

Test of Common Method Bias

The data obtained in this study were obtained using a questionnaire method, and the results may end up leading to common method bias. Before data analysis, all questionnaire items were subjected to Harman's one-way test, and the results showed that there were 11 factors with eigenvalues greater than 1. The maximum factor variance explained was 23.926%, which was much lower than the critical value of 40%, indicating that there was no significant common method bias.⁷⁹

Descriptive Statistics and Correlation Analysis

The descriptive characteristics and correlations of the main variables are shown in Table 1 and 2. Since respondents' gender, residential location, and SES may be related to SEC and PTG, we tested the correlations between these variables

Table 1 Descriptive Characteristics

Variable	Category	Subcategory	N	Mean	S.D.
GI			1203	22.940	5.049
	Gender	Male	659	22.713	5.497
		Female	544	23.215	4.435
	Residential location	Urban	709	23.030	5.156
		Rural	494	22.812	4.894
PTG			1203	76.838	18.468
	Gender	Male	659	77.042	19.339
		Female	544	76.590	17.368
	Residential location	Urban	709	77.367	19.385
		Rural	494	76.079	17.056
SEC			1203	60.078	11.420
	Gender	Male	659	59.378	11.755
		Female	544	60.926	10.950
	Residential location	Urban	709	60.756	11.216
		Rural	494	59.105	11.648

Abbreviations: GI, group identity; SEC, social-emotional competence; PTG, post-traumatic growth.

Table 2 Correlation Analysis

	1	2	3	4	5	6
1. Gender	–					
2. Residential location	–0.025	–				
3. SES	0.126**	–0.049	–			
4. GI	–0.026	–0.001	0.064*	–		
5. SEC	0.068*	0.071*	0.130**	0.247**	–	
6. PTG	–0.120	–0.034	0.068*	0.223**	0.341**	–

Notes: * $p < 0.05$, ** $p < 0.01$, two-tailed tests.

Abbreviations: SES, socioeconomic status; GI, group identity; SEC, social-emotional competence; PTG, post-traumatic growth.

Table 3 Predictors for PTG Using SEC as Mediator

Variables	PTG		SEC		PTG	
	β	t	β	t	β	t
GI	0.219	7.780***	0.242	8.727***	0.146	5.251***
SEC					0.304	10.845***
Gender			0.059	2.112*	-0.032	-1.186
Residential location			-0.064	-2.318*	-0.012	-0.454
SES			0.104	3.719***	0.023	0.838
R ²	0.054		0.286		0.139	
F	17.053***		26.764***		38.491***	

Notes: * $p < 0.05$, *** $p < 0.001$.

Abbreviations: SES, socioeconomic status; GI, group identity; SEC, social-emotional competence; PTG, post-traumatic growth.

and other main variables. The results showed that gender and residential location were associated with SEC only, while SES was significantly associated with GI, SEC and PTG. Meanwhile, GI, SEC, and PTG were significantly and positively correlated ($0.105 \leq r \leq 0.341$).

Validity of Measurement Variables

We used AMOS to perform a CFA and test the discriminant and convergent validity of our main variables (GI, SEC, and PTG). The proposed simple mediator model was a successful calculation overall match. CFA showed that the measure model was appropriate; fit indices were acceptable: $\chi^2/df = 2.977$, CFI = 0.976, TLI = 0.986, RMSEA = 0.040, SRMR = 0.038.

Mediation Analysis of SEC

In the simple mediation model with explicit variables, it is simple and easy to use SPSS PROCESS, which is more suitable to do the mediation model test with explicit variables than AMOS. Therefore, Multiple regression analysis was conducted using SPSS PROCESS (model 4) with GI as the independent variable, PTG as the dependent variable, and SEC as the mediating variable (Figure 1). As we expected, as shown in Table 3, GI had a significant positive predictive effect on PTG ($\beta = 0.219$, $t = 7.780$, $p < 0.001$). In addition, GI was significantly and positively correlated with SEC ($\beta = 0.242$, $t = 8.727$, $p < 0.001$) and SEC was significantly and positively correlated with PTG ($\beta = 0.304$, $t = 10.845$, $p < 0.001$).

In addition, we used the bootstrap method to detect mediating effects. After controlling for gender, residential location, and SES variables, the 95% confidence interval for the indirect path of GI affecting PTG through SEC was [0.045,0.104], and the 95% confidence interval for the direct path on PTG was [0.091,0.200], and neither contained 0 (Table 4). This indicates that GI can indirectly influence PTG through SEC and has a direct effect on PTG, with the direct effect accounting for 66.47% of the total effect and the mediating effect accounting for 33.53%.

In summary, the findings suggest that GI of high school students is significantly and positively related to PTG, with SEC playing a mediating role, supporting H1 and H2 (Figure 2).

Discussion

Discussion of the Results

In this study, we examined the fundamental influence path that underlie the relationship between GI and PTG, as well as the mediating role of SEC in this relationship, utilizing a sample of Chinese adolescents who experienced COVID-19.

Table 4 Decomposition of the Total, Direct, and Mediating Effects

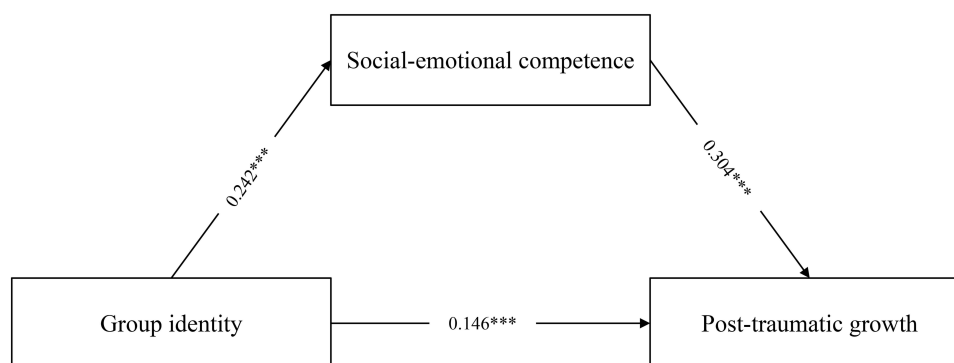
Path	Effect size	Boot SE	Boot LLCI	Boot ULCI	Ratio
Indirect effect	0.074	0.015	0.045	0.104	33.53%
Direct effect	0.146	0.028	0.091	0.200	66.47%
Total effect	0.219	0.028	0.164	0.275	–

Abbreviations: SE, standard error; LLCI, Lower level of confidence interval; ULCI, upper level of confidence interval.

Our findings revealed that GI exerts a positive influence on PTG, and the mediating effect of SEC between GI and PTG was found to be significant. These results validate our initial hypotheses and further expand upon previous research by elucidating the relationship between GI and PTG.

The current study has identified a significant relationship between GI and PTG, which is consistent with previous research demonstrating that high GI exhibit high psychological resilience and mental health.^{81,82} Meanwhile, We compared some studies by other scholars in Europe, North America and China and found a convergence of results.^{19,52,83} This supports the notion that social identity theory can serve as a framework for investigating and illustrating the association between GI and PTG. The theory accomplishes this by explaining the process through which individuals connect with social groups, illustrating how GI can serve as the basis for individual self-worth, and providing individuals with strategies to confront and overcome challenges in their lives.⁸⁴ These strategies can assist individuals in managing and coping with adversity.⁸¹ Regardless of the group to which an individual belongs, improving one's GI or an individual's capacity to cope with adversity can be a crucial factor. Increasing one's sense of belonging and value through higher GI or a strong affiliation with any group can facilitate both physical and mental well-being, thereby maintaining a healthy psychological state.^{85,86} Interventions aimed at enhancing GI have been found to reduce loneliness caused by the COVID-19 pandemic, improve people's sense of belonging and value, and promote psychological health.⁸⁷ Additionally, individuals who establish GI through social media during the COVID-19 pandemic have reported a reduction in loneliness and psychological distress, and high GI predict low psychological distress and stress.⁸⁸ Clinical medicine research indicates that social support, social inclusion, good social relationship interventions,⁸⁹ and tailored psychological interventions can help alleviate psychological distress and promote PTG after traumatic experiences such as COVID-19 hospitalization.⁹⁰ These findings reinforce the role of GI in promoting PTG among individuals.

As anticipated, we confirmed the mediating effect of SEC and verified H2. Our findings extend previous research on GI and PTG, indicating that GI is a positive predictor of SEC, consistent with existing research indicating that individuals with high GI probably exhibit high SEC.^{91,92} Research has shown that GI probably promotes social connections and improves interpersonal relationships.⁹³ For instance, Willems et al⁹⁴ observed that individuals with high GI exhibit greater self-disclosure, which fosters the development and maintenance of positive interpersonal relationships. Neuroscience studies have additionally highlighted that robust social relationships can influence the physiological

**Figure 2** SEC as a mediator between GI and PTG.

Notes: *** $p < 0.001$; gender, residential location, and SES were used as control variables.

activity of the downregulated autonomic nervous system, the hypothalamic-pituitary-adrenal (HPA) axis, and brain networks,⁹⁵ ultimately impacting the formation of individual SEC.⁹⁶ Furthermore, Allison et al⁹⁷ suggested that students with strong social bonds acquire greater SEC learning during socialization, leading to elevated SEC. Our findings also align with the social cognitive theory, which posits that individuals construct social connections to acquire perceptions that guide their emotional and social behaviors.⁶⁷ Therefore, perceptions are considered central to influencing SEC.⁶⁸ In a COVID-19 pandemic study, Ntontis⁴⁶ found a positive correlation between GI, social support, and resilience, while perceived stress was negatively correlated. This implies that GI and social support can shape individuals' perceptions, helping them regulate their mental health, alleviate psychological stress, and ultimately enhance SEC.^{98,99} During traumatic events such as COVID-19, receiving support from one's social network (eg, family, friends, community) can foster a sense of belonging and self-worth while promoting SEC.¹⁰⁰ Therefore, fostering GI probably is crucial for improving SEC in individuals.

Furthermore, our study revealed a positive association between SEC and PTG. A neurological review has suggested that enhancing SEC through intervention in psycho cognitive processes can reduce postoperative risk and aid in recovery from post-traumatic brain injury.¹⁰¹ A meta-analysis of adolescents found that those with high SEC are likely to have high psychological resilience and positive attitudes toward adversity,¹⁰² supporting the emotional intelligence theory of SEC on human psychological regulation.²⁶ Zysberg and Raz¹⁰³ found that individuals with high SEC during the COVID-19 pandemic were able to regulate their psychology and emotions and cope positively with adversity. In addition, individuals with high SEC tend to employ a variety of emotion regulation strategies, and effective strategies can help them face trauma and life positively, explore their self-worth, and discover new possibilities, thereby PTG.²⁷ This result is novel and provides evidence to expand the social learning theory.¹⁰⁴ According to the social learning theory, human behavior and skills are acquired through social and observational learning.¹⁰⁵ SEC, as a skill that can be acquired through socialization,¹⁰⁶ suggests that individuals can observe and imitate others to acquire SEC.¹⁰⁷ Individuals with high levels of GI have more opportunities to acquire SEC, which may increase their level of SEC.¹⁰⁸ Moreover, they are more likely to obtain social support in interpersonal relationships,¹⁰⁹ which may help individuals experience.¹¹⁰ Several studies have shown that individuals with a high level of GI during Covid-19 have closer contact with other group members,¹¹¹ which helps them develop SEC during socialization.^{112,113} This, in turn, gives them the confidence to overcome the negative effects of Covid-19¹¹⁴ and promotes PTG.¹¹⁵ Therefore, to help people recover from the traumatic event of Covid-19, promoting PTG can be achieved by improving SEC.

Implications

In the post COVID-19 era, many people are facing great psychological pressure and trauma, and this study innovatively links GI, SEC and PTG with important theoretical and practical significance. First, this study explores the internal connection between GI and PTG based on the relationship between people and the collective and people and society, which enriches the research on the formation mechanism of PTG in the post COVID-19 era and provides a new perspective for future research. Second, this study further enriches the research on SEC in promoting physical and mental health of adolescents, which can help adolescent groups improve their SEC to help them better understand and cope with the emotional needs of others¹¹⁶ and thus better cope with their own trauma, which also supports and to some extent deepens social identity theory and emotional intelligence theory. Finally, this study is the first to consider the relationship between the three, which provides new and revealing ideas for understanding the processes and mechanisms of PTG.

On the other hand, there are practical implications. First, based on the positive correlation pathway between GI and PTG, we should pay attention to the development of adolescents' GI or other group identities in society, and also realize the importance of the construction of adolescents' relationships with groups and society, which helps them overcome the far-reaching effects of COVID-19 or other disasters. For instance, the establishment of supportive social networks and group identities¹¹⁷ can help individuals alleviate the stress, psychological anxiety, and distress brought on by epidemics and disasters.^{88,114} Second, we can incorporate social-emotional education into the curriculum to enhance the SEC of adolescents to help people better cope with trauma and distress and promote their PTG. For example, in promoting individual PTG, we social-emotional education is integrated into the daily curriculum while encouraging students to actively understand, express, and learn, which can help them deal with their personal and social relationships and is one

of the key elements to promote people's PTG in the post COVID-19 era. Finally, the PTG process and mechanisms deepened and refined by this study from a new perspective can also inform psychotherapy and counseling, helping therapists to better understand and respond to the needs of their patients.¹¹⁸

Limitations and Future Directions

The present study has limitations, which also indicate directions for future research and exploration. Firstly, as this study is a cross-sectional study, it may introduce bias when determining the causal relationship between adolescent GI, SEC, and PTG. Future studies should use methods such as longitudinal studies or experimental studies, which can repeatedly measure adolescents' psychological processes and change patterns over a longer period, in order to obtain more comprehensive and in-depth information and conclusions. Secondly, the sample selection may be biased, as questionnaires often only cover adolescents who can be reached in eastern China. Future studies can expand the sample size of adolescents by selecting samples from family, school, and community dimensions, or from different regions in eastern, central, and western China, to reduce the possibility of sample selection bias. Finally, as the data came from a sample of high school-aged adolescents in China, the representativeness of the results may be limited. Future studies should validate these findings across different populations to ensure their generalizability.

Conclusion

This study examined the relationship between GI and PTG in the post COVID-19 era from the perspective of human-society relationships. The findings indicate that GI not only directly influences PTG but also indirectly affects it through SEC. The results of this study provide further evidence for the expansion and deepening of the process mechanism and relationship between GI and PTG. They also reveal how the interaction between individuals and groups, and individuals and society, affects individual PTG. These insights can inform public mental health repair in the post COVID-19 era.

Data Sharing Statement

The dataset supporting the conclusions of this article will be made available from the corresponding author upon request.

Ethics Approval

This study was approved by the Research Ethics Committee of Zhejiang Normal university (Code NO.: ZSRT2023056). The study adhered to the principles of the Declaration of Helsinki. All the participants were asked to read and sign an informed consent form.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflicts of interest in this work.

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