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Perceptions of one's socioeconomic condition are associated with subjective socioeconomic status (SSS) and relative deprivation (RD). SSS involves comparing oneself to society, whereas RD entails comparison with others who are similar and includes an emotional component. We examined the role of SSS and RD in three technology addiction subtypes (i.e., video games, pornography, and online gambling) and determined the mediating role of shame. A total of 657 Korean young adults aged 19-34 years participated (51.0% women). RD showed significant positive associations with all technology addiction subtypes, whereas SSS showed no significant associations. Shame significantly mediated the associations of SSS and RD with technology addiction subtypes. Lower SSS and higher RD were associated with higher shame levels, which were related to severe technology addiction. Socioeconomic perceptions and emotions have intertwined roles in pathways to technology addiction. Therefore, a multifaceted approach is required to ensure effective prevention and intervention.

Keywords: subjective socioeconomic status, relative deprivation, shame, video game addiction, pornography addiction, online gambling addiction

Introduction

Among young adults, the uncontrolled and problematic use of video games, pornography, and online gambling is of particular concern due to its potentially harmful consequences in daily functioning (e.g., interpersonal relationships), posing risks for significant socioeconomic and psychological damage to individuals and society as a whole (Achab et al., 2011; Gainsbury, 2015). These problematic behaviors may fall within the spectrum of behavioral

addiction (Griffiths & Kuss, 2015). Although there is still an ongoing debate as to whether behavioral addiction can be viewed in line with addiction to substances such as alcohol (Sassover & Weinstein, 2020), its phenomenological aspects resemble those of substance use disorders (e.g., salience, conflict, and relapse) (Griffiths, 2005). In addition, several previous studies have shown that the chronicity of these behaviors involves neurological changes similar to those observed in substance use disorders (Dong et al., 2015).

Video games, pornography, and online gambling are heterogeneous in their specific characteristics and behavioral patterns (Rozgonjuk et al., 2023). Nevertheless, they can be collectively classified as forms of "technology addiction" due to their common reliance on information technology and shared psychosocial risk factors (Akbari et al., 2023; Tarafdar et al., 2020). This classification suggests a heightened likelihood of cross-addiction among these subtypes, where one form of addiction may substitute for or co-occur with another in the same individual—a phenomenon com-

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monly observed in addictive disorders (McFadden, 2010). Therefore, addressing the shared risk mechanisms underlying technology addiction may enable more cost-effective and comprehensive intervention strategies.

One potential risk mechanism may involve factors related to individuals' socioeconomic status. Recent research has emphasized the importance of subjective perceptions or emotional responses related to socioeconomic disparities (Tan et al., 2020). Subjective socioeconomic status (SSS) refers to individuals' perception of their status within a societal structure, rather than merely focusing on one's actual economic or social resources (Adler et al., 2000). It has been suggested to be a better predictor of addiction than objective socioeconomic status indicators (Assari et al., 2019), and may also be an important risk factor for technology addiction as well (Lin & Liu, 2020). Previous studies have indicated that low SSS is positively related to delayed discounting, reflecting biased behavioral patterns that focus on short-term and immediate rewards (Ishii, 2015). Furthermore, it may result in negative emotional experiences that manifest as increased depressive symptoms and cortisol levels (Hoebel et al., 2017; Wright & Steptoe, 2005). These negative emotional experiences and behavioral patterns are risk factors for dysfunctional Internet use (Akbari et al., 2023; Negash et al., 2016).

Relative deprivation (RD) is another factor associated with socioeconomic status; however, unlike SSS, RD refers to subjective perceptions of the socioeconomic gap compared to similar others (i.e., not the entire society) and includes emotional reactions, such as dissatisfaction or resentment, resulting from it (Smith et al., 2012). Thus, RD is a construct that blends cognitive perception and emotional response, and is experienced within a close social and cultural context, suggesting that even individuals from groups with high objective or subjective socioeconomic status can experience intense RD (Callan et al., 2017). Similar to SSS, RD may relate to risk-taking attitudes and behaviors, including gambling, crime, and other non-normative activities (Keshavarz et al., 2021; Mishra & Novakowski, 2016), including increased tendency for delay discounting (Callan et al., 2011). Additionally, a recent study showed a potential link between higher RD and lower self-improvement motivation (Zheng et al., 2023). This finding suggests that individuals with higher RD may resort to maladaptive coping mechanisms such as addiction instead of pursuing constructive self-im-

provement. Thus, RD's psychological and emotional repercussions can contribute to a risk of addictive behaviors, such as gambling (Callan et al., 2011; Elgar et al., 2018). Research on the relationship between RD and technology addiction is limited, but studies have suggested a possible association of RD with compulsive behaviors on the Internet (Lin & Liu, 2020; Qian et al., 2018).

Although SSS and RD partly overlap, their unique characteristics may provide distinct insights into how individuals perceive and react to socioeconomic situations. Moreover, both can help us to better understand the intrapersonal responses stemming from these perceptions, such as negative emotions, which may contribute to a heightened risk for addictive behaviors. However, few studies have compared the relative contributions of SSS and RD to mental health. In an exceptional study, RD was found to be a stronger predictor of mental health outcomes, such as depression, than SSS (Callan et al., 2015). More importantly, RD showed a higher correlation with smartphone addiction among adolescents than SSS and was suggested to be a more proximal predictor than SSS (Lin & Liu, 2020). In the above studies, the correlation between SSS and RD ranged from $-.13$ to $-.66$ (Callan et al., 2015; Lin & Liu, 2020), suggesting that the two are related but distinct constructs, and supporting the possibility that RD may be a more salient predictor of technology addiction. This is likely because RD involves social comparisons with psychologically close or similar individuals, leading to negative emotional responses stemming from perceived gaps (Smith et al., 2012). Given these specific social comparisons and the resulting emotional distress, individuals with high RD are more likely to adopt avoidance strategies rather than directly confront their immediate environment. However, empirical evidence on the comparative effects of SSS and RD is still limited.

Additionally, we focused on the potential role of shame as a mediator to elucidate the mechanisms by which SSS and RD are related to technology addiction. Shame is a painful emotion arising from comprehensive and negative self-assessments (Tangney & Dearing, 2003). Within the framework of socioeconomic disparities, having low SSS or high RD may intensify shame by threatening the social self (Dickerson et al., 2004; Wilkinson, 2001), especially if individuals attribute these perceived disparities to their shortcomings. Technology use motivated by the desire to escape from one's real self or avoid painful emotions may lead to addic-

tion (Melodia et al., 2022). In this context, the shame underlying these motivations has been suggested as an essential risk factor for various addictive behaviors (e.g., Chisholm & Gall, 2015). More specifically, shame can trigger technology use rooted in escape and avoidance motivations by inducing significant distress and stifling individuals' hope for self-improvement and sense of accountability (Chisholm & Gall, 2015; Tangney et al., 1992). In the context of low SSS and high RD, individuals may experience increased shame owing to perceived social failure, prompting them to seek relief through online activities. For young adults who have grown up with the Internet as a staple in their daily lives, these virtual spaces often offer accessible and seemingly safe refuge from shame (Kardefelt-Winther, 2014).

This study aimed to investigate the effects of SSS and RD on technology addiction, and understand how shame may serve as an underlying mechanism in this relationship. As mentioned, it has been suggested that SSS may have an indirect effect on technology addiction as a distal factor through RD (Lin & Liu, 2020). Conversely, some researchers argue that individuals who experience high RD may report lower SSS (Kuo & Chen, 2023). Thus, although SSS (which assesses one's relative position within the broader social hierarchy) and RD (which reflects comparisons with similar others and the associated emotional responses) are conceptually distinct constructs (Callan et al., 2015; Smith et al., 2012), they may influence each other. With this in mind, we focused on examining the independent effects of each variable while accounting for their covariance, as reflected in the following hypotheses:

- H1. Lower SSS and higher RD would be associated with higher levels of technology addiction (i.e., gaming, pornography, and gambling) among young adults.
- H2. Shame would mediate the relationships between SSS, RD, and technology addiction. Specifically, lower SSS and higher RD would be associated with higher levels of shame, which in turn would be associated with higher levels of technology addiction.

Methods

Participants and Procedures

Participants were 657 Korean adults between the ages of 19 and 34

years, recruited from a pool of adult panels registered with an online survey company (334 women, $M_{\text{age}} = 27.19$, $SD_{\text{age}} = 4.34$). Of the participants, 57.6% reported a monthly average household income within KRW 2,000,000–6,000,000. Regarding education, 44.7% were university graduates, 22.5% had attended university, and 11.6% were junior college graduates. We employed an anonymous survey method to minimize potential response bias (Alexander & Fisher, 2003). The study was preregistered in the Open Science Framework (OSF) prior to analysis (DOI: 10.17605/OSF.IO/SZDHW), with minor deviations from the preregistered design to better address the study aims.

Measures

Addictive video game use. The Clinical Video Game Addiction Test 2.0 (C-VAT 2.0, 11 items) was used to measure the severity of addictive video game use (Jang et al., 2020; Van Rooij et al., 2017). Originally developed as a clinician-administered tool, this scale was later validated in Korea as a self-report measure, demonstrating reliability and validity in capturing gaming addiction severity in Korean young adults (Jang et al., 2020). In our study, participants responded to binary items (1 = “yes,” 0 = “no”) based on experiences in the past six months, modified from the original reference period of one year to maintain consistency across technology addiction measures. While the previous study of this scale did not report an internal consistency coefficient (Jang et al., 2020), the Cronbach's alpha in our study was .83.

Addictive pornography use. The Problematic Pornography Consumption Scale (PPCS, 18 items) assessed addictive pornography use severity based on the respondents' experiences over six months (Böthe et al., 2018). Each item is rated on a seven-point Likert scale (1 = “never,” 7 = “all the time”). PPCS has been validated with good internal consistency (Cronbach's $\alpha = .95$) (Böthe et al., 2024). In this study, the Cronbach's Alpha value was .97.

Addictive online gambling. The Canadian Problem Gaming Index (CPGI, 9 items) is a widely used self-report measure for gambling addiction (Ferris & Wynne, 2001; Kim et al., 2011). Participants rate each item on a four-point Likert scale (0 = “never,” 3 = “almost always”), with higher scores indicating severe addiction. In the present study, while maintaining the basic structure of the scale, the term “gambling” for all items was modified to “online

gambling” and the reference period was revised to six months. Cronbach’s Alpha was found to be .75 in a previous study (Kim et al., 2011) and .86 in the current study.

Subjective socioeconomic status. The SSS was measured using the MacArthur Ladder Scale, a widely used single-item questionnaire (Adler et al., 2000). Participants were asked to choose the step on a ladder depicted visually (ranging from 1 to 10) that best reflected their socioeconomic status. The chosen step was then converted to a corresponding score (e.g., selecting the 3rd step would score three points), with higher scores indicating higher subjective socioeconomic status.

Relative deprivation. RD was measured using the Korean version of the Personal Relative Deprivation Scale (PRDS, 3 items), a partial modification of the original scale (Callan et al., 2011; Kim et al., 2018). The items in the Korean version of the PRDS are rated on six-point Likert scale (1 = “strongly disagree,” 6 = “strongly agree”). Cronbach’s Alpha was found to be .75 in a previous study (Kim et al., 2018) and .86 in the current study.

Shame. The Internalized Shame Scale (ISS, 24 items) was used to measure the level of shame (Cook, 1988). Each item is rated on a five-point Likert scale (1 = “never,” 5 = “almost always”), with higher scores indicating greater internalized shame. The Korean version of the ISS has been shown to have good internal consistency, with a Cronbach’s alpha of .93 in a previous study (Lee & Choi, 2005) and .98 in our study.

Statistical Analysis

Following preliminary analyses, two structural equation models were designed to test the study hypotheses using the maximum likelihood (ML) method in Mplus 8.8. The first model examined the relationship of SSS and RD with technology addiction and compared their path coefficients. A mediation model was then tested in which SSS and RD led to technology addiction subtypes via shame. SSS was included as an observation variable (measured with a single item), and RD was a latent variable using three individual items as indicators. Shame was a latent variable using four subfactors as indicators (Lee & Choi, 2005). Addictive video game use, pornography use, and online gambling were treated as individual variables considering their unique symptom clusters identified in a previous study (Rozgonjuk et al., 2023). The sum of all

items of each technology addiction scale was included in the models as observation variables instead of constructing latent variables, as the factor structure of the modified scales has not been validated. Further, the total scores are meaningful in measuring the severity of each addiction subtype. Sex was included in both models as a covariate based on the finding that men are relatively vulnerable to technology addiction (Dong & Potenza, 2022; Grubbs et al., 2019; McCormack et al., 2014). Additionally, objective socioeconomic status indicators (i.e., household income and education levels) were considered covariates for a more rigorous test of the subjective perception of socioeconomic status and related experiences. Model fit was tested based on χ^2 statistics, comparative fit index (CFI), Tucker-Lewis index (TLI), standardized root mean residual (SRMR), and root mean square error of approximation (RMSEA). The CFI and TLI were considered to have a good fit when their significance was higher than .90. The SRMR and RMSEA were considered a reasonably good fit under .08 and close fit under .05 (MacCallum et al., 1996; McDonald & Ho, 2002). Indirect associations were examined using the bootstrap method with 1,000 resamples and bias-corrected 95% confidence intervals (CIs) (Yoon et al. 2021).

Ethics

The Institutional Review Board (IRB) of the affiliated university (IRB no. SKKU 2022-09-033-001) approved this study. The study procedures adhered to the ethical standards. Moreover, the participants were informed about the study’s nature and their consent was obtained for data utilization.

Results

Descriptive Statistics and Bivariate Correlations

Table 1 presents descriptive statistics and bivariate correlations. The three technology addiction subtypes showed significant positive correlations with one another. SSS had a significant negative correlation with RD, but showed non-significant correlation with technology addiction. RD was significantly and positively correlated with all technology addiction subtypes. SSS and RD significantly correlated with shame. Shame, in turn, was positively correlated with all addiction subtypes. Education and income posi-

Table 1. Descriptive Statistics and Bivariate Correlations

Variables	1	2	3	4	5	6	7	8	9
1. Sex (men)	-								
2. Income	-.003	-							
3. Education	-.111**	.025	-						
4. SSS	-.011	.185***	.175***	-					
5. RD	-.053	-.024	-.068 [†]	-.285***	-				
6. Shame	.009	-.010	-.171***	-.337***	.552***	-			
7. Video game addiction	.171***	-.065 [†]	-.140***	-.053	.183***	.296***	-		
8. Pornography addiction	.414***	-.039	-.133***	-.068 [†]	.249***	.341***	.461***	-	
9. Online gambling addiction	.261***	.073 [†]	-.136***	-.011	.143***	.279***	.439***	.540***	-
Mean	-	6.13	5.16	4.71	9.84	26.89	1.48	30.83	1.53
SD	-	7.31	1.46	1.73	3.56	22.65	2.27	19.26	4.53

Income = monthly household income (million won); SSS = subjective socioeconomic status; RD = relative deprivation.

[†] $p < .1$, ** $p < .01$, *** $p < .001$.

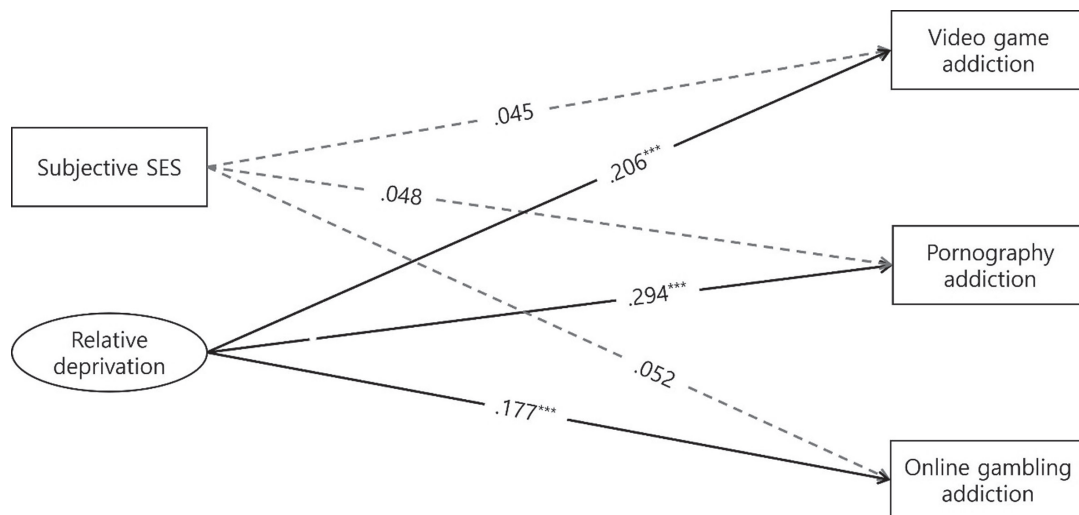
Table 2. Model Fit Indices for Structural Equation Models

Model	χ^2 (df)	CFI	TLI	RMSEA [90% CI]	SRMR	R^2
Non-mediated model	71.552 (20)	.968	.938	.063 [.047, .079]	.043	.088*, .268 [†] , .117 [‡]
Mediation model	235.381 (57)	.962	.944	.069 [.060, .078]	.047	.131*, .309 [†] , .160 [‡]

$N = 657$.

CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean residual.

R^2 : *video game addiction, [†]pornography addiction, [‡]online gambling addiction.

**Figure 1.** Relationship between subjective socioeconomic status (SSS), relative deprivation (RD) and technology addiction.

Presented values are standardized coefficients. Covariates in the model include sex, income, and education. Solid lines indicate statistically significant paths, while dashed lines indicate non-significant paths.

*** $p < .001$.

tively correlated with SSS, but not RD. Education negatively correlated with addiction subtypes, whereas income showed no significant correlation with addiction. Finally, sex significantly correlated with addiction subtypes.

Relationship between Subjective Socioeconomic Status, Relative Deprivation, and Technology Addiction Subtypes
Table 2 presents the results of a structural equation model incorporating SSS and RD in relation to the three technology addiction

subtypes. The model exhibited an adequate fit. As presented in Figure 1, SSS did not show a significant relationship with any of the technology addiction subtypes. In contrast, RD exhibited a significant and positive relationship with all subtypes of technology addiction. This model explained 8.8%, 26.8%, and 11.7% variances in video game addiction ($R^2 = .088, p = .001$), pornography addiction ($R^2 = .268, p < .001$), and online gambling addiction ($R^2 = .117, p < .001$), respectively.

Mediating Role of Shame in the Relationship between Socioeconomic Perceptions (Subjective Socioeconomic Status and Relative Deprivation) and Technology Addiction
As presented in Table 2, the model that included shame as a medi-

ator in the association of SSS and RD with technology addiction exhibited adequate fit. After controlling for the effects of income, education, and sex, the results showed that shame significantly mediated the association of SSS and RD with technology addiction (Figure 2). Specifically, SSS was negatively associated with shame, whereas RD was positively associated with shame. Shame, in turn, was significantly and positively related to all three technology addiction subtypes. Furthermore, this model explained 13.1%, 30.0%, and 16.0% variances in video game addiction ($R^2 = .131, p < .001$), pornography addiction ($R^2 = .309, p < .001$), and online gambling addiction ($R^2 = .160, p < .001$), respectively.

Table 3 presents the results of the indirect effects analyzed using bootstrapping methods, a robust approach for assessing media-

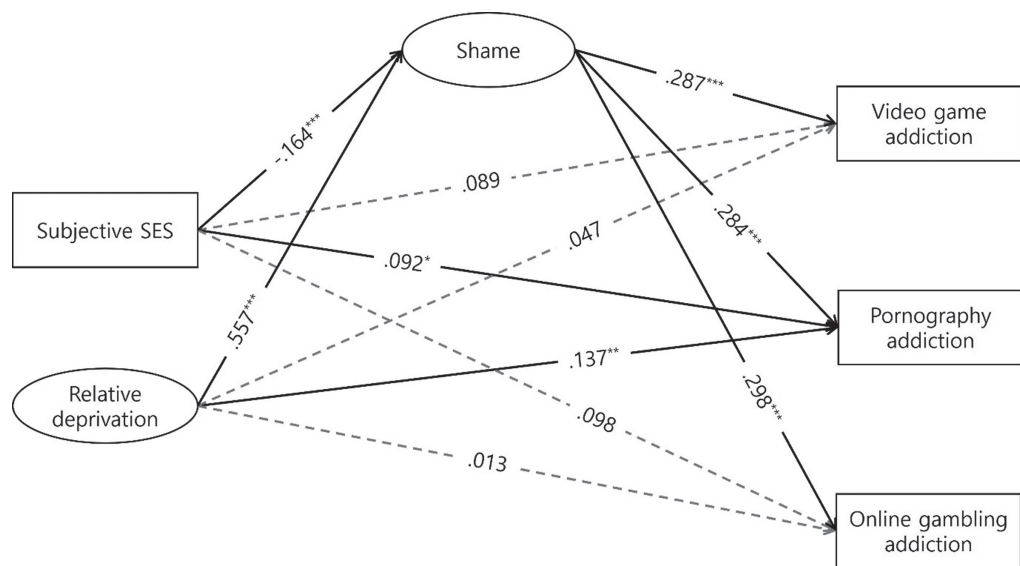


Figure 2. Mediating role of shame in the relationship between subjective socioeconomic status (SSS), relative deprivation (RD), and technology addiction.

Presented values are standardized coefficients. Covariates in the model include gender, income, and education. Solid lines represent statistically significant paths, while dashed lines represent non-significant paths.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3. Results of Indirect Associations Analysis Using Bias-Corrected Bootstrapping

Pathway	β	SE	p value	LLCI	ULCI
SSS $\rightarrow$ Shame $\rightarrow$ Video game addiction	-.047	.014	.001	-.077	-.023
SSS $\rightarrow$ Shame $\rightarrow$ Pornography addiction	-.047	.013	<.001	-.072	-.022
SSS $\rightarrow$ Shame $\rightarrow$ Online gambling addiction	-.049	.014	<.001	-.072	-.023
RD $\rightarrow$ Shame $\rightarrow$ Video game addiction	.160	.033	<.001	.095	.225
RD $\rightarrow$ Shame $\rightarrow$ Pornography addiction	.158	.031	<.001	.097	.220
RD $\rightarrow$ Shame $\rightarrow$ Online gambling addiction	.166	.033	<.001	.107	.235

$N = 657$.

SSS = subjective socioeconomic status; RD = relative deprivation; LLCI = lower limit of 95% confidence interval; ULCI = upper limit of 95% confidence interval.

tion effects (Preacher & Hayes, 2008). RD was associated with all three technology addiction subtypes through its association with shame. Conversely, SSS showed indirect negative associations with all technology addiction subtypes through its negative association with shame. In addition, when the indirect association of shame was controlled, SSS still showed a significant direct association with pornography addiction. The positive association between RD and pornography addiction remained significant even after controlling for the indirect association via shame. In contrast, its associations with video game addiction and online gambling addiction were insignificant.

Discussion

This study aimed to elucidate the mechanisms underlying the three variants of technology addiction—gaming, pornography use, and gambling—by examining the contributions of SSS and RD, factors related to socioeconomic perception, and the mediating role of shame. Data from 657 young adults in Korea were analyzed using structural equation modeling, accounting for the effects of objective socioeconomic status (i.e., income and education) and sex.

Our findings showed that RD, but not SSS, was positively associated with all forms of technology addiction. This is consistent with previous research that recognized RD as a stronger predictor of mental health problems than the SSS (Callan et al., 2015). This finding underscores the need for a more nuanced understanding of the different indicators of socioeconomic perceptions and their effects on psychological health. Although the underlying reason remains unclear, it may be attributable to the closer psychological proximity to the reference group in RD compared to SSS and the incorporation of emotional responses in RD, a component that is absent in SSS (Smith et al., 2012). No significant associations were found between SSS and technology addiction, contrary to the findings of a previous study that showed that both RD and SSS predicted smartphone addiction (Lin & Liu, 2020). This may be due to differences between addiction subtypes and further suggests that the effect of SSS may depend on sample characteristics. In the aforementioned study, adolescents were recruited from a single school (Lin & Liu, 2020). Therefore, low SSS may reflect a

perceived disadvantage among potential competitors. We expect that as the homogeneity among participants decreases, the effect of SSS may weaken. Alternatively, age could be a potential factor to consider, such that younger adults in the present study may perceive a greater likelihood of positive change in their future than older individuals (Durbin et al., 2019). Thus, they may value the comparative advantages of their age cohort or close peers over their current SSS.

When shame was incorporated into the model, the associations of SSS and RD with technology addiction became more pronounced. This suggests that individuals who perceive themselves as being lower in the socioeconomic hierarchy may experience heightened shame, which increases their risk of developing various technology addiction. Regarding RD and technology addiction subtypes, shame was found to fully (for online gaming and gambling) or partially (for pornography) mediate their associations. Our findings stress the importance of shame as a “key affective response to social-evaluative threats (Dickerson et al., 2004).” These findings are consistent with evidence highlighting the triggering effects of self-critical thoughts and emotions on addictive behaviors, such as excessive gaming or gambling (Castro-Calvo et al., 2022; Pascual-Leone et al., 2011). Shame may be a link connecting the negative perception of an individual’s societal position to maladaptive behaviors, such as technology addiction.

However, some of the findings require further investigation. When shame was included in the model, SSS had a direct positive association with pornography addiction. These findings were unexpected, given the previous finding that lower SSS is associated with increased vulnerability to addiction (Assari et al., 2019). Interestingly, some previous studies have suggested that high SSS may increase susceptibility to mental health problems in specific contexts. For example, individuals with higher SSS may have more difficulty in coping with stress than others when they receive more social support because they perceive the support as a challenge to their autonomy and self-reliance (Hooker et al., 2020). This finding suggests that both high and low SSS may be uniquely associated with the development of pornography addiction through different pathways. Specifically, low SSS may be linked to pornography addiction through emotional distress or myopic decision-making (Hoebel et al., 2017; Ishii, 2015), whereas high SSS

could increase pornography addiction susceptibility by increasing individuals' vulnerability to stress because of an inflated ego or high pressure for social achievement (Luthar & Becker, 2002; Piff, 2014). Alternatively, our findings may be based on a suppression effect, wherein the inclusion of shame in the model altered the observed relationship between SSS and pornography addiction (Paulhus et al., 2004).

Another notable finding is the partial mediating role of shame in the relationship between RD and pornography addiction. This may be due to the different characteristics of technology addiction subtypes. The hallmark of gambling and many online games is their uncertain and variable outcomes, requiring payment to participate in the activity or to increase the possibility of achieving a positive outcome (e.g., winning, prizes) (Steinmetz et al., 2022). Even if participants are willing to pay, rewards are not guaranteed and often depend on chance or skill (Deterding et al., 2022; King et al., 2010). In contrast, pornography is freely available on many websites (Morichetta et al., 2021) and provides consistent and predictable rewards for sexual gratification (Cooper, 1998). In addition to shame, RD is associated with various negative affective states such as depression or stress (Callan et al., 2015). Considering that shame could increase the risk of self-destructive behaviors (Cassello-Robbins et al., 2019), if the negative affective state caused by RD does not include a self-critical component, individuals may prefer to cope through safer means rather than risk greater loss and failure. In this context, pornography may be the preferred coping strategy for those experiencing emotional problems other than shame due to RD. This may explain why the direct association of RD, unmediated by shame, remained significant. This possibility is also indirectly supported by the finding that our model explained the highest variance for pornography addiction.

Our findings have various theoretical and clinical implications regarding technology addiction. By identifying the associations between SSS, RD, shame, and technology addiction, our findings extend the theoretical understanding of the psychological mechanisms underlying addictive behaviors, particularly in the context of individuals' subjective perceptions of their socioeconomic situation. Our findings suggest that focusing on RD rather than SSS may be useful for understanding technology addiction among young adults. Additionally, an integrated approach that includes

shame may clarify the pathways through which high RD is related to technology addiction and provide information about the context in which low SSS acts as a risk factor. Our findings may inform future interventions and preventive efforts. For instance, cognitive behavioral therapy (CBT) and self-compassion training can specifically target shame and other emotional responses to RD and SSS among individuals at risk of developing technology addiction. By promoting positive attitudes toward oneself and adaptive coping strategies, these interventions may help to address the influence of socioeconomic perceptions on technology addiction (Ferrari et al., 2019; Stevens et al., 2019). Furthermore, our findings call for societal and cultural changes to address SSS and RD. Policies to reduce income inequality, promote social mobility, and ensure an equitable distribution of wealth, including education to prevent excessive social comparison, can mitigate feelings of socioeconomic disparity and subsequent shame that contributes to technology addiction. This underscores the need for a multifaceted approach to address technology addiction with strategies ranging from individual interventions to broader societal reforms.

This study has some limitations. Our sample was limited to young adults in Korea, which may restrict the generalizability of our findings to other populations. Additionally, while self-report measures enabled comprehensive data collection and access to participants' subjective perceptions, they may have been prone to social desirability and recall bias. Finally, using a cross-sectional design, this study cannot infer causality. Although our model was based on a thorough review of the existing literature, few studies have also suggested other possible directionality of influence between variables (e.g., De Jong & Cook, 2021). Therefore, our findings should be interpreted with caution.

Several promising topics for future studies remain. We focused on examining the independent effects of SSS and RD as predictors of technology addiction. However, some studies suggest that individuals with low SSS may be more likely to experience RD (Lin & Liu, 2020; Yoo et al., 2019), whereas others propose that high RD can lead individuals to report lower SSS (Kuo & Chen, 2023). These findings imply that the pathways linking SSS, RD, shame, and technology addiction may be diverse. Identifying these pathways in future studies could greatly enhance intervention strategies by providing a richer array of options for addressing technol-

ogy addiction. Given that the relationships among the variables examined in this study varied across subtypes of technology addiction, it would also be valuable to explore potential moderators that may account for these differences. Furthermore, future studies should seek to replicate our findings with other potential subtypes of technology addiction (e.g., social media addiction) (Sun & Zhang, 2021) while also considering various psychological factors, such as attributional style (Shaghaghay et al., 2011), that may influence these behaviors.

In conclusion, this study underscores the need to consider socioeconomic perceptions and the painful emotions that result from them, such as shame, when understanding and treating technology addiction. Our insights into the associations of SSS and RD in addictive behaviors may lay the groundwork for developing focused interventions and fostering a healthy society. Exploring these dynamics expands our understanding of technology addiction and highlights broader questions regarding the interplay between socioeconomic factors, emotional responses, and mental health. This contributes to an evolving field of research with crucial implications for individual and societal well-being.

Author contributions statement

Kyeongwoo Park, Ph.D. Student at Sungkyunkwan University, conceptualized the study, conducted the investigation, performed the formal analysis, and led the original draft writing and project administration. Hyein Chang, Professor at Sungkyunkwan University, acquired the funding, supervised the research process, conducted data analysis, and participated in writing, review, and editing of the manuscript.

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Dual Pillars of Resilience: Community and Individual factors in Young Adults' Mental Health During the Coronavirus Disease 2019

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This study examined how resilience and community resilience moderate and mediate the relationship between perceived stress and mental health (depression, anxiety, and anger) among adults in their 20s during the COVID-19 pandemic. An on-line survey of 229 participants was analyzed using SPSS Windows software version 23.0 for descriptive and correlation statistics, while PROCESS Macro (version 3.3) was employed to assess the moderated mediation effects. The results indicated significant correlations among all variables, with resilience mediating the relationship between perceived stress and mental health. Community resilience significantly moderated the relationship between resilience and mental health. The moderated mediation effect was also significant, suggesting that community resilience influences how resilience mediates the effect of perceived stress on mental health. These findings highlight the importance of strengthening community resilience to enhance mental health outcomes. Based on the results, the study's strengths, limitations, and suggestions were discussed.

Keywords: perceived stress, community resilience, resilience, mental health, coronavirus disease 2019

Introduction

It is no exaggeration to say that Coronavirus Disease 19 (COVID-19), which broke out at the start of 2020, is not just a disease but has changed the lives of people around the world. It has been found that the disasters such as COVID-19 or extreme external stressor events have negative effects on individual lives (Boon et al., 2012; Kimhi & Shamai, 2004). According to previous studies

on past epidemic situations (Ebola, SARS, MERS, H1N1, etc.), individuals experience fear not only for their own health but also for infecting their family or neighbors (Cava et al., 2005; Desclaux et al., 2017). In addition, they also experience job loss and economic damage (Pellecchia et al., 2015), and such experiences have been reported to be related to psychopathologies such as depression (Hawryluck et al., 2004), anxiety (Bai et al., 2004), and anger (Marjanovic et al., 2007).

All the studies conducted in China (Huang & Zhao, 2020; Wang et al., 2020), Italy (Cellini et al., 2020; Gualano et al., 2020), and Spain (González et al., 2020) reported increases in anxiety, depression, and stress after isolation, and some of them reported complaints of sleep disturbance (Cellini et al., 2020; Gualano et al., 2020; Huang & Zhao, 2020), and even the experience of PTSD (González et al., 2020). These results show that the mental health of many citizens is threatened in the COVID-19 era.

Considering that the COVID-19 pandemic, which adversely affects mental health, is expected to last for a long time, it is urgent to

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identify factors that have a protective effect on individual mental health. Protective factors in a disaster refer to factors that protect individuals by preventing threats, minimizing risks, improving their ability to adapt after experiencing a disaster, and giving them the ability to control stress (Halpern & Tramontin, 2007).

Previous studies on the relationship between disasters and mental health have reported that resilience is an effective protective factor. This study focused on psychological resilience, the ability of individuals to cope with perceived stress during the COVID-19 pandemic, and social structural resilience, the ability of the community to cope with the COVID-19 pandemic. The term used to indicate psychological resilience is 'Resilience,' commonly defined in psychology as 'an ability to effectively utilize internal and external resources' (Waters & Sroufe, 1983) or 'the ability to lower stress by being affected less by stressful situations and to cope effectively in stressful situations' (Luthar & Cicchetti, 2000). The term used to indicate social structural resilience is 'Community Resilience' defined as 'the ability of an individual's community to return to normal and recover from disasters and adversity.'

Recently, the importance of not only individual resilience but also the resilience of the community to which individuals belong in disaster situations has attracted increasingly more attention (Leykin et al., 2013; Masten & Narayan, 2012). Previous studies have shown that community resilience affects individual adaptation after a disaster (Braun-Lewensohn & Sagy, 2014; Comfort et al., 2010), and have reported that, depending on the circumstances, community aid or supportive relationships are more effective than individual approaches (Allen et al., 2010; Shalev & Freedman, 2005).

Allen et al. (2010) and Shalev & Freedman (2005) emphasized the formation of a supportive relationship that ensure safety and address needs between individual and community. In particular, the assertion that environmental intervention is more effective than psychotherapeutic intervention in the early stages of a disaster (Bonanno, 2004; Gist & Woodall, 2000) shows the importance of proper implementation of personal and environmental intervention according to the stage of disaster and specific circumstances.

The purpose of this study was, accordingly, to examine whether the resilience, as an individual factors and community resilience,

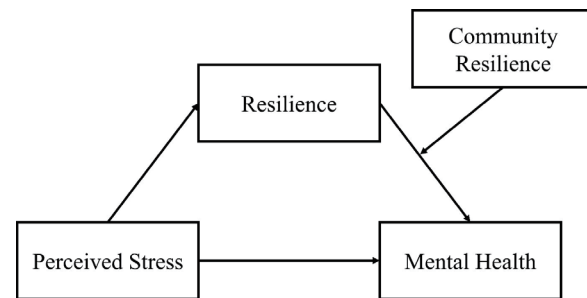


Figure 1. Theoretical model of the prospective study.

as a social factor, mitigate the effects of subjectively perceived stress on mental health in the disaster situation of COVID-19. Community resilience was used as a moderating variable in this study, based on its characteristics that it is influenced by community policies, responses, and practical support rather than individual experiences, and it is formed over a long period of time rather than a short period of time. The effect on individual mental health was measured by dividing it into depression, anxiety, and anger. Figure 1 shows theoretical models.

Methods

Ethics Statement

The project (KYU-2020-040-04) was approved by Konyang University Institutional Review Board ethics committee.

Study Design

The study employed a cross-sectional design, utilizing an online survey to collect data. Participants were 229 adults in their 20s residing in The Republic of Korea, and the survey was conducted online due to COVID-19. After excluding 55 subjects, including those under the age of 19, those over the age of 30, overseas residents, and insincere respondents.

Participants

229 subjects' (male: $n = 52$, 22.7%; female: $n = 170$, 74.2%; unknown: $n = 7$, 3.1%) data were used for analysis. Except for one subject (0.4%), all ($n = 228$, 99.6%) had no confirmed COVID-19 experience. Four subjects (1.7%) had experience of self-isolation by medical staff, and the remaining ($n = 225$, 98.3%) had not. 14 subjects ($n = 6.1\%$) had someone who has been infected with COV-

Table 1. Demographic Characteristics (*n* = 229)

	Percentage (<i>n</i>)
Gender	
Male	22.7 (52)
Female	74.2 (170)
Unspecified	3.1 (7)
Self-quarantine experience	
Yes	1.7 (4)
No	98.3 (225)
Confirmed diagnosis experience	
Yes	0.4 (1)
No	99.6 (228)
Confirmed diagnosis experience of someone	
Yes	6.1 (14)
No	93.9 (215)

ID-19 (family, friends, and acquaintances) and the remaining (*n* = 215, 93.9%) had not. Table 1 presents participant demographic characteristics.

Measures

Perceived Stress Scale (PSS)

The perceived stress in the COVID-19 situation was measured by the PSS developed by Cohen et al. (1983) and translated by Park and Seo (2010). It consists of a total of ten items and is responded using a five-point Likert scale. “How often have you felt that way during the COVID-19 crisis” was added to the instructions to measure stress in the context of COVID-19. Cronbach’s α of this scale was .87 in Park and Seo (2010) and .84 in this study.

Center for Epidemiological Studies–Depression Scale (CES–D)

Depression was measured using the Korean-version CES-D integrated and validated by Chon et al. (2001) from the CES-D developed by Radloff (1977). It consists of a total of 20 items and is responded using a four-point Likert scale. Cronbach’s α of this scale was .91 in Chon et al. (2001) and .92 in this study.

Beck Anxiety Inventory (BAI)

Anxiety was measured using the Korean-version BAI modified by Yook and Kim (1997) from the BAI developed by Beck et al. (1988) and translated by Kwon (1992). It consists of a total of 21 items and is responded using a four-point Likert scale. Cronbach’s α of this scale was .91 in Yook and Kim (1997) and .93 in this study.

State–Trait Anger Expression Inventory (STAXI)

Anger was measured using Korean-version STAXI (STAXI-K) developed by Chon et al. (1997) based on the STAXI developed by Spielberger et al. (1988). Anger was measured using STAXI-K developed by Chon et al. (1997) based on the STAXI developed by Spielberger et al. (1988). It is responded using a four-point likert scale and Cronbach’s α of this scale was .93 in Chon et al. (1988) and .93 in this study.

Korean–Connor–Davison–Resilience Scale (K–CD–RISC)

Resilience was measured using K-CD-RISC developed by Connor & Davidson (2003) and translated and validated by Baek et al. (2010). It consists of a total of 25 items and is responded using a five-point Likert scale. Cronbach’s α of this scale was .89 in Connor & Davidson (2003), .93 in Baek et al. (2010), and .91 in this study.

Conjoint Community Resiliency Assessment Measure (CCRAM)

Community resilience was measured using the Community Resilience Scale developed by An and Kang (2018) based on the short form of Conjoint Community Resiliency Assessment Measure-28 (CCRAM-28) developed by Leykin et al. (2013). It consists of a total of ten items. Cronbach’s α of this scale was .75–.91 in Leykin et al. (2013), .89 in An and Kang (2018) and .86 in this study.

Data Analysis

Analysis in this study was performed using IBM Statistics version 23.0 program and PROCESS Macro v3.3. After checking the descriptive statistics of each variable and correlation, bootstrapping was used to verify whether the mediating effect of Resilience was statistically significant in the relationship between perceived stress and mental health. The moderating effect of community resilience in the relationship between Resilience and mental health was verified using hierarchical regression analysis. After verifying the mediation model and the moderation model, the moderated mediating effect of resilience and community resilience in the relationship between perceived stress and mental health was verified using PROCESS Macro Model 14 and significance was verified using bootstrap verification.

Table 2. Means, Standard Deviations, and Correlations among Study Variables

Measure	1	2	3	4	5	6
1. Perceived Stress	-					
2. Resilience	-.39***	-				
3. Community Resilience	-.17**	.51***	-			
4. Depression	.72***	-.62***	-.36***	-		
5. Anxiety	.55***	-.37***	-.30***	.72***	-	
6. Anger	.51***	-.38***	-.34***	.64***	.60***	-
M	21.59	58.97	31.40	23.21	13.40	14.96
SD	6.08	14.25	6.25	11.69	10.87	6.37

M = mean, SD = standard deviation.

** $p < .01$, *** $p < .001$.

Results

Correlation

Correlation analysis and descriptive statistics of perceived stress, depression, anxiety, anger, resilience, and community resilience were performed, and Table 2 shows the results. The results of the correlation analysis are as follows: perceived stress showed a significantly negative correlation with resilience ($r = -.39, p < .001$) and community resilience ($r = -.17, p < .01$), and significantly positive correlation with depression ($r = .72, p < .001$), anxiety ($r = .55, p < .001$), and anger ($r = .51, p < .001$). Resilience showed significantly positive correlation with community resilience ($r = .51, p < .001$) and significantly negative correlation with depression ($r = -.72, p < .001$), anxiety ($r = -.56, p < .001$), and anger ($r = -.51, p < .001$). Community resilience showed significantly negative correlation with depression ($r = -.36, p < .001$), anxiety ($r = -.30, p < .001$), and anger ($r = -.34, p < .001$).

Mediating Effect of Resilience in Relationship between Perceived Stress and Mental Health in COVID–19 Situation

This study used the PROCESS macro to verify whether Resilience mediates the relationship between perceived stress and mental health in the COVID-19 situation. 5,000 samples were re-sampled and confidence intervals were set at 95%. The bootstrapping of Resilience in the relationship between perceived stress and mental health showed the mediating effect was significant in all depression ($\beta = .16, CI95 = .10$ to $.22$), anxiety ($\beta = .07, CI95 = .02$ to $.14$), and anger ($\beta = .08, CI95 = .02$ to $.14$).

Moderated Mediating Effect of Resilience and Community Resilience in Relationship between Perceived Stress and Mental Health in COVID–19 Situation

The moderated mediating effect was verified using the SPSS Process Macro Model 14 to verify the effect of perceived stress on mental health through Resilience varies according to the level of community resilience.

First, the effect of interaction term of resilience and community resilience on depression in the process where perceived stress affects depression through resilience was significant ($\beta = .12, t = 2.94, p < .01$). In addition, the amount of change in R according to the addition of the interaction term was also statistically significant ($\Delta R^2 = .01, p < .001$). This means that the effect of perceived stress on depression through resilience may vary depending on the level of community resilience. Bootstrap verification was performed to estimate the conditional indirect effect following the proposal of Preacher et al. (2007), and the result showed that an increase in community resilience reduces the indirect effect. In addition, it was found that the indirect effect was significant in all the level of community resilience ($-1SD B = -.35, CI95 = -.44$ to $-.27, Mean B = -.29, CI95 = -.36$ to $-.21, +1SD B = -.22, CI95 = -.31$ to $-.13$).

These results indicate that the mediating effects on the pathways from perceived stress through resilience to depression may be controlled by the level of community resilience suggests that the lower community resilience may lead to the experience of stronger mediating effect of resilience between perceived stress and depression. Figure 2 shows these relationships in schematic form.

Second, the effect of interaction term of resilience and community resilience on anxiety in the process where perceived stress af-

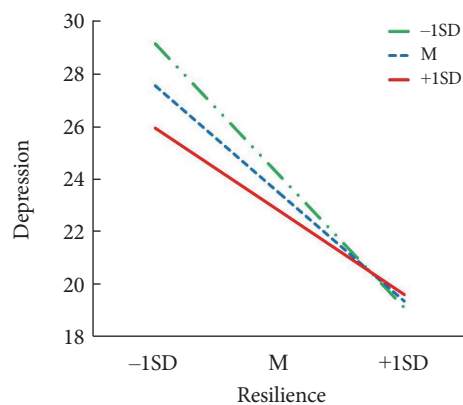


Figure 2. Conditional indirect effect of resilience on depression by levels of community resilience.

fects anxiety through resilience was significant ($\beta = .17$, $t = 3.10$, $p < .01$). In addition, the amount of change in R according to the addition of the interaction term was also statistically significant ($\Delta R^2 = .03$, $p < .001$). This means that the effect of perceived stress on anxiety through resilience may vary depending on the level of community resilience. Bootstrap verification was performed to estimate the conditional indirect effect, and the result showed that an increase in community resilience reduces the indirect effect. In addition, the indirect effect was found to be statistically significant under lower community resilience but not to be statistically significant under higher community resilience ($-1SD$ $B = -.15$ $CI95 = -.26$ to $-.04$, $Mean$ $B = -.06$ $CI95 = -.16$ to $.03$, $+1SD$ $B = .02$ $CI95 = -.09$ to $.14$).

These results indicate that, while the mediating effects on the pathways from perceived stress through resilience to anxiety is significant under low community resilience and increase in community resilience leads to decrease in mediating effect, the mediating effect become insignificant when the community resilience increases above a certain level. Figure 3 shows these relationships in schematic form.

Third, the effect of interaction term of resilience and community resilience on anger in the process where perceived stress affects anger through resilience was significant ($\beta = .19$, $t = 3.35$, $p < .01$). In addition, the amount of change in R according to the addition of the interaction term was also statistically significant ($\Delta R^2 = .03$, $p < .001$). This means that the effect of perceived stress on anger through resilience may vary depending on the level of community

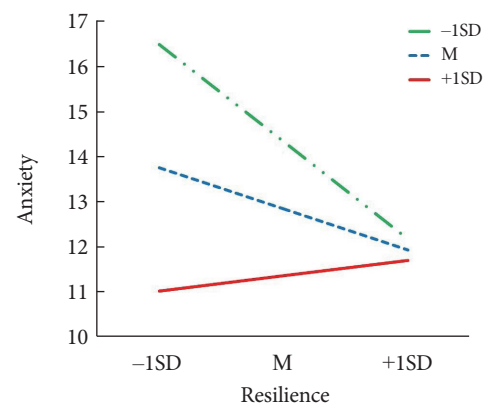


Figure 3. Conditional indirect effect of resilience on anxiety by levels of community resilience.

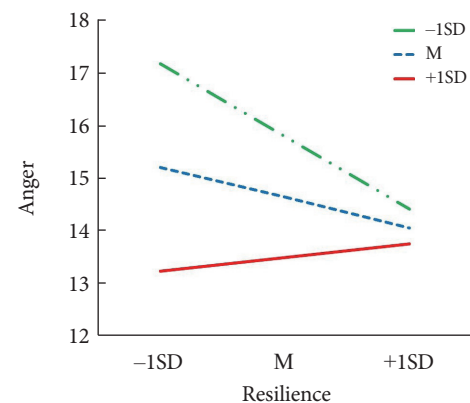


Figure 4. Conditional indirect effect of resilience on anger by levels of community resilience.

resilience. Bootstrap verification was performed to estimate the conditional indirect effect, and the result showed that an increase in community resilience reduces the indirect effect. In addition, the indirect effect was found to be statistically significant under lower community resilience but not to be statistically significant under higher community resilience ($-1SD$ $B = -.10$ $CI95 = -.16$ to $-.03$, $Mean$ $B = -.04$ $CI95 = -.10$ to $.02$, $+1SD$ $B = .02$ $CI95 = -.05$ to $.09$).

These results indicate that, while the mediating effects on the pathways from perceived stress through resilience to anger is significant under low community resilience and increase in community resilience leads to decrease in mediating effect, the mediating effect become insignificant when the community resilience increases above a certain level. Figure 4 shows these relationships in schematic form.

Discussion

This study explored how Resilience, an individual factor, and community resilience, an environmental factor, act as protective factors in the relationship between perceived stress and mental health (depression, anxiety, anger) in the COVID-19 pandemic era.

First, the effect of perceived stress on mental health in the COVID-19 pandemic era was found to be significant. This is consistent with the results of previous studies that perceived stress worsens individual mental health (Bai et al., 2004; Hawryluck et al., 2004; Marjanovic et al., 2007) and supports the result that the perceived stress worsens individual mental health in COVID-19 pandemic era (Cellini et al., 2020; González et al., 2020; Gualano et al., 2020; Wang et al., 2020).

Second, it was found that the partial mediating effect of resilience is significant in the relationship between perceived stress and mental health during the COVID-19 pandemic era, indicating that higher perceived stress leads to lower individual resilience and higher levels of depression, anxiety, and anger. This finding is supporting the results that the resilience act as a protective factor mitigating the negative effects of perceived stress on individual's psychological well-being (Abbas & Zhiqiang, 2020), distress (Kimhi et al., 2020) during the COVID-19 pandemic era.

Third, the moderated mediating effect of resilience and community resilience in the relationship between perceived stress and mental health during the COVID-19 pandemic era was found to be significant. The indirect effect was shown to decrease with an increase in the level of community resilience. Specifically, it was found that the effects on anxiety and anger were not significant when the level of community resilience was above medium. This indicates that when resilience is reduced due to heightened perceived stress in the COVID-19 pandemic era, there is no significant effect on anxiety and anger if the community resilience level is above medium. This suggests that the factors influencing individual depression, anxiety, and anger in the COVID-19 pandemic era differ, particularly regarding anxiety and anger which may be managed at the community level. Anxiety, stemming from uncertainty about the future and perceptions of COVID-19's threat to oneself, can be mitigated by community resilience.

The communities, therefore, should take measures such as pro-

vision of accurate information about the COVID-19 virus and accurate notification of policy changes so that individuals understand the COVID-19 pandemic era and respond appropriately. Other ways communities contribute to the alleviation individual anxiety include sufficient supply of medical supplies (masks, disinfectants, inspection tools, etc.) through prevention of hoarding and sudden price increases, establishment of prompt treatment environment and transparent infection management system, and mitigation of the infectivity and risk of COVID-19 through vaccination and treatment development.

Anger is caused by the degree of direct damage, the direction and response methods of community response, and injustice experienced by individuals. In the early stage of a disaster, in particular, individuals are greatly affected by the community since it is difficult for them to respond to sudden change. Communities are likely to choose to limit outdoor activities, such as banning gatherings and limiting the number of gathered people, to prevent the spread of COVID-19. Since, in this process, individuals are directly affected by breakdown of interpersonal relationships, reduced income, and job loss, the direction and specific details of the policy should be determined through sufficient communication between individuals and the community. In addition, fairness should be maintained in areas such as punishment for violations of quarantine rules, support of relief goods, and treatment opportunities during lockdown.

The results of this study support existing claims that protective factors for individuals' mental health in disaster situations such as COVID-19 include environmental as well as personal aspects (Boon et al., 2012). In particular, it shows that the response level of the community is important in the early stage when it is difficult for individuals to respond appropriately due to the enormous damage caused by disaster exceeding the individual's ability to respond, consistent with the results of previous studies that, in the early stages of a disaster, environmental intervention is more effective than psychotherapeutic intervention (Bonanno, 2004; Gist & Woodall, 2000). The influence of community resilience was found to be stronger in individuals with low resilience than in individuals with high resilience. These results suggest that a lower individual ability to overcome difficulties in the COVID-19 pandemic era leads to a stronger influence of external factors. For ex-

ample, they are vulnerable to psychopathological problems caused by disaster situations such as COVID-19. Therefore, intervention for the vulnerable, such as the elderly living alone, basic livelihood security recipients, and those with underlying diseases, or those under economic difficulties such as the unemployed and self-employed should be prioritized. In the early stages of a disaster, the focus should be on minimizing the direct damage caused by the COVID-19 pandemic era by providing relief items such as clothes and food, supplying medical supplies such as hand sanitizer and masks, testing, and medical support, and afterwards, depending on the speed of spread of COVID-19, it should be dealt with flexibly.

Implication

The strength of this study lies in it identified predictive that deteriorate mental health and protective factors in the context of COVID-19. Under the circumstances that studies on the causal relationship between psychological factors is limited, whether the concept of resilience, which was considered an effective protective factor in previous disaster situations such as SARS and MERS, applies to the COVID-19 pandemic era was tested. This study, by verifying the interaction between internal and external factors, shows that both type of factors should be considered for mental health protection in the COVID-19 pandemic era, and it is important to consider that there are differences in effective intervention methods depending on the stage of the disaster. In disaster situations, psychological interventions and community involvement play complementary roles, and their effectiveness may vary depending on the stage of the disaster. During the initial phase, community engagement becomes increasingly crucial, as individuals often struggle to adapt to sudden changes and the ensuing trauma. Therefore, it is essential to leverage community resources and support to minimize individual suffering and facilitate rapid adaptation to the disaster context. In the early stage, measures such as accurate information dissemination regarding the disease, management of confirmed cases, and vaccine development are vital to preventing the spread of the disease. These actions can help mitigate misinformation and anxiety surrounding the infection, thereby fostering trust within the community.

As the disaster progresses to the dissemination stage, an in-

crease in the number of confirmed cases and contacts necessitates interventions focused on prevention and treatment. It is imperative to prevent shortages of medical supplies and price hikes, ensuring that adequate medical services are provided to those affected. Additionally, policies such as social distancing and lockdowns may be required; however, it is crucial to minimize the adverse effects of prolonged policy implementation and ensure appropriate sanctions for non-compliance. Given the occupational and economic changes that arise from hospitalization and distancing measures, support mechanisms must be established to address these widespread changes.

Moreover, emotional challenges such as depression, anxiety, and anger are anticipated to rise due to disruptions in interpersonal relationships, leisure activities, shifts in social atmospheres, and experiences of illness or loss among close contacts. Thus, psychological interventions for individuals have become increasingly necessary. Considering the widespread psychological impact of COVID-19 on the entire population, there is a significant shortage of institutions and professionals capable of providing psychological services. Therefore, exploring safe and effective intervention methods through online platforms, smartphones, and telephone communications is imperative.

To enhance resilience, it is crucial to guide the public in accessing relevant programs and activities aimed at fostering resilience. Furthermore, individuals requiring psychological intervention should be systematically identified to receive initial psychological support. Following this, long-term interventions should be advocated through specialized community agencies or remote counseling services. The implementation of these strategies is anticipated to facilitate more effective delivery of psychological services.

This study presented theoretical data on the direction of intervention to protect mental health in the COVID-19 pandemic era by confirming the influence of resilience and community resilience. It is important for communities to develop the capacity to withstand disaster situations and have the resilience to adapt quickly and effectively to the changing COVID-19 pandemic era. In an epidemic disaster situation, the supply of medical supplies and daily necessities and medical support for isolation and recovery should be sufficient. In the process of responding, support to alleviate the economic difficulties of job seekers and those who

have lost their jobs is needed, and through continuous and smooth communication between community members or between community deciders and members, specific needs should be identified, and realistic countermeasures should be presented.

The limitations of the study are as follows. First, there is a limitation in that the demographic characteristics were not evenly distributed. Due to the significant difference in the number of participants by gender (male = 52, female = 170), we analyzed the moderated mediation effects by separating the genders to examine gender differences. The results showed that anxiety was significant for both males and females, while depression and anger were not significant for either gender, indicating no gender differences. However, the results for depression and anger may be due to the small sample size, so future research should aim to recruit a enough participants to verify potential gender differences.

Author contributions statement

Jegeun Yu, Clinical Psychology Intern at Konyang University, collected and analyzed data, and led manuscript preparation.

Wonyoung Song, professor at Konyang University, served as the research grant and supervised the research process. All authors provided critical feedback, participated in revision of the manuscript, and approved the final submission.

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