



A Longitudinal Study of the Relationship between Identity Development Processes and Self-Esteem among Korean College Freshmen

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Abstract

Self-esteem may serve both as a psychological resource that facilitates personal identity development processes and as an outcome of a consolidated identity. However, longitudinal evidence remains limited. This study tracked 641 South Korean first-year college students (48.0% women; $M_{\text{age}} = 19.13$) across four waves spaced three months apart during their first academic year to test bidirectional links between Luyckx et al.'s (2008) five dimensions of personal identity processes (exploration in breadth, exploration in depth, commitment making, identification with commitment, ruminative exploration) and self-esteem. Random-intercept cross-lagged panel models were used to examine how changes in each of the processes may follow and be followed by changes in self-esteem. Results highlight initial volatility and gradually increasing engagement in personal identity development processes. Higher self-esteem predicted greater engagement in identity processes, and a stronger sense of identification with commitment predicted higher self-esteem later in the year but not earlier. By demonstrating that self-esteem is not merely an outcome of identity development but also a psychological resource facilitating identity development, these findings contribute to the literature on the development of the self-system in youth.

Keywords Identity · Self-esteem · Emerging adulthood · RI-CLPM

Introduction

Personal identity refers to how individuals define who they are, often centering on their goals, values, and beliefs (Vignoles et al., 2011). Although identity develops throughout the life span, it becomes particularly salient during the transition to adulthood. Understanding this developmental task requires considering how personal identity fits within the broader self-system that includes constructs such as self-esteem, a general evaluation of personal worth (Y. Park & Johnson, 2025). Theoretically, self-esteem and personal

identity development can be mutually reinforcing. Self-esteem can provide the psychological resources needed to explore and commit to one's identity, while the growing clarity about one's identity can strengthen self-esteem. However, most empirical studies have examined self-esteem primarily as an outcome of identity development, leaving their potential bidirectional relationship underexplored (cf., Luyckx, Klimstra, Duriez, et al., 2013). The current study addressed this gap by examining the longitudinal associations between personal identity development and self-esteem among South Korean college freshmen across their first academic year.

Processes of Personal Identity Development

The model with which this study conceptualized the process of personal identity development is the dual-cycle model by Luyckx et al. (2008), which is a contemporary extension of the Eriksonian identity theory. In his foundational theory of psychosocial development, Erikson (1968) defined identity

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development as the formation of a sense of self that provides a sense of sameness and continuity. Marcia's (1966) identity status paradigm operationalized this rather complex idea into a two-dimensional model emphasizing exploration and commitment as the key processual axes that determine how achieved (i.e., well-developed) one's personal identity is. The ideal final state of personal identity development, then, is defined as personal identity achievement, which refers to the state of having firm choices for themselves after thorough exploration of options. This simple yet powerful model has been widely used in identity research for decades, but it was limited in that it did not reflect the dynamic and ongoing nature of identity development.

Responding to this shortcoming, Luyckx et al. (2008) expanded Marcia's identity status paradigm into a dual-cycle model that posits five dimensions of process that comprise two cyclical phases of identity formation and identity evaluation. The formation phase includes exploration in breadth, or the search for potential identity options, and commitment making, the establishment of initial choices following exploration in breadth. The evaluation phase includes exploration in depth, the process of examining how well the selected commitment fits the individual by seeking relevant information and experiences, and identification with commitment, the sense of certainty about the suitability of that commitment resulting from exploration in depth. The cyclical aspect of this model is that if, after exploration in depth, youth believe that the selected commitment is not suitable for themselves, they would return to the formation phase to search for alternative identity options. A fifth process, ruminative exploration, captures the maladaptive tendency to remain stuck in continuous consideration of alternatives without progressing to commitment or consolidation. The five dimensions of this dual-cycle model have been applied to personal identity research globally, including with college students in South Korea (Y. Park et al., 2023).

Interrelation with Self-Esteem

As part of the larger self-system, young people's personal identity development and self-esteem may influence each other reciprocally. Given that one of the core features of high self-esteem is enhanced initiation (Baumeister et al., 2003), self-esteem may serve as a psychological resource for young people to initiate exploration processes and confidently make determinations about new and existing commitments (Grotevant, 1987). On the other hand, the developing sense of personal identity, as it approaches personal identity achievement, can become a sturdy basis for enhancing self-esteem. That is, as an individual's notions of their personal interests, beliefs, and values consolidate and crystallize, these self-definitions can serve as an "internal

frame of reference" for making self-affirming evaluations of self-worth (i.e., self-esteem), rather than being shaped by others' expectations or evaluations (Toder & Marcia, 1973, p. 288).

Applying these potential relations specifically to the dual-cycle model (Luyckx et al., 2008), the five dimensions of personal identity development may each have different relations with self-esteem. Considering self-esteem's effect of initiating personal identity development, higher self-esteem may lead to more active engagement in the adaptive personal identity processes (exploration in breadth, exploration in depth, commitment making, and identification with commitment) and lower maladaptive process (ruminative exploration). Considering the effect of personal identity development providing a foundation for self-esteem, identification with commitment, which represents the closest processual dimension to personal identity achievement, may show this potential effect most prominently. Commitment making, signifying a process approaching personal identity achievement, may also lead to higher self-esteem. Ruminative exploration, representing the opposite of identification with commitment or commitment making and, instead, being unable to approach personal identity achievement, may be followed by lower self-esteem. Exploration in breadth and exploration in depth's relations to personal identity achievement and self-esteem are less straightforward, as they may either progress toward commitment making and identification with commitment or cycle back into further exploration in breadth.

Despite the potential bidirectional associations, self-esteem has mostly been examined only as an outcome of personal identity development in cross-sectional and experimental research. Although limited in directly addressing temporal sequences, there have been several cross-sectional correlational analyses of the five personal identity development dimensions and self-esteem conducted in various parts of the world (Lemiere et al., 2025; Luyckx, Klimstra, Schwartz, & Duriez, 2013; Mannerström et al., 2017; Mastrotheodoros & Motti-Stefanidi, 2017; Nakama et al., 2015; Rivnýák et al., 2022). Across these studies, identification with commitment and commitment making consistently showed significant positive correlation with self-esteem with medium effect sizes, with identification with commitment often having a stronger correlation than commitment making. Ruminative exploration has been negatively correlated with self-esteem with medium effect size.

Correlations between exploration in breadth and exploration in depth with self-esteem have been inconsistent. Specifically, correlations between exploration in breadth and self-esteem have tended to be non-significant, significantly negative (Luyckx, Klimstra, Schwartz, & Duriez, 2013), or significantly positive (Luyckx, Klimstra, Duriez, et al.,

2013; Mannerström et al., 2017; Nakama et al., 2015), typically with small effect sizes. Correlations between exploration in depth and self-esteem have also most often been non-significant, with a few studies finding small positive correlations (Luyckx, Klimstra, Schwartz, & Duriez, 2013; Nakama et al., 2015). As Luyckx, Klimstra, Duriez, et al. (2013) point out, these relations have been often interpreted as self-esteem being outcomes of personal identity development processes when temporal sequence cannot be ascertained from the analyses. Longitudinal research is needed to clarify the process of personal identity development and self-esteem influencing each other.

A few experimental studies have also investigated self-esteem as an outcome of identity development. In an early experimental study (Marcia, 1967), self-esteem was found to be less affected by external feedback among individuals with higher identity development than among those with lower levels. In a more recent study, participants were assigned either to an upward social comparison condition, in which they compared themselves with superior individuals—a process that often accentuates feelings of inferiority and diminishes self-evaluation—or to a control condition (Moon et al., 2025). It was found that individuals with a clear sense of identity maintained high self-esteem even under upward social comparison. These results demonstrate a protective effect of identity development on self-esteem when facing situations that lower self-esteem. However, these studies did not examine the relation between personal identity development and self-esteem bidirectionally.

Only one study to date has tested temporal sequences between the five personal identity process dimensions and self-esteem (Luyckx, Klimstra, Duriez, et al., 2013). The study examined college and high school students in the Dutch-speaking part of Belgium using cross-lagged panel models (CLPMs) with one-year intervals, which yielded interesting differences between the age groups. Among high school students, those with higher self-esteem showed more identification with commitment and less ruminative exploration a year later. However, the reverse effect of identity processes on self-esteem was not observed. Among college students, reciprocal effects were found between commitment making and identification with commitment with self-esteem, where young adults with higher self-esteem displayed higher commitment making and identification with commitment and, conversely, those with higher commitment making and identification with commitment showed higher self-esteem a year later. In interpreting the diverging patterns, these authors suggest that self-esteem consistently functions as a psychological resource for identity development, particularly for consolidating commitments (i.e., higher identification with commitment and lower ruminative exploration). On the other hand, having and strengthening

personal identity commitments (i.e., commitment making and identification with commitment) may matter for self-esteem only in the college context because students' personal identities at this stage are sufficiently consolidated to serve as a foundation for making self-guided life decisions that enhance self-esteem. In contrast, during high school, when students still receive substantial guidance from teachers and parents and their personal identity is not yet fully developed, the positive effects of identity development may not emerge.

Put simply, self-esteem can consistently serve as a resource for active personal identity development, but only once personal identity has developed enough to guide life choices can it, in turn, support self-esteem. However, the CLPM used in that study has methodological limitations as it does not differentiate between the between-person and within-person effects, requiring caution in interpretation. Furthermore, these relations have not yet been tested in other youth populations. The current study, therefore, sought to address this research gap by applying the random intercept cross-lagged panel model (RI-CLPM), a method that can overcome the limitations of the CLPM, to a different youth population.

The Context of South Korean First-Year College Students

In studying the development of identity and self-esteem, the unique sociocultural context of the examined population must be considered (Bronfenbrenner, 1979; Y. Park & Johnson, 2024). For first-year college students in South Korea, this includes the social system and cultural expectations surrounding college entrance. South Korea has an extremely competitive education system with a narrow definition of achievement that relies on standardized testing based on rigid national curricula. More broadly as a society, South Korean culture places excessive value on college entrance based on academic achievement, deeming acceptance to elite colleges as the gatekeeper to social and economic mobility (Ahn & Baek, 2013). In fact, 74% of students go to college after graduating high school (MOE & KEDI, 2024). Consequently, to avoid the fear of failing in this nation-wide competition, adolescents devote countless hours to exam preparation (OECD, 2019), often postponing exploration of their personal goals, values, and future directions until after college entrance (Y. Park et al., 2023).

After enduring years of college entrance prep, many first-year students begin college with a desire to enjoy freedom from the relentless pressure of future-oriented studying. At the same time, however, the completion of this long-anticipated goal confronts them with a new developmental challenge of having to set their own life directions and engaging

in the task of personal identity development (Christiaens et al., 2021). Thus, the first year of college can be a period of tension between the wish to take a break from structured demands and the need to actively construct a personal identity. In this context, it remains an open question whether Korean college freshmen engage in personal identity development actively enough to benefit from high self-esteem, or whether they have personal identities consolidated enough to enhance self-esteem.

Although no study to date has examined longitudinal links between personal identity development and self-esteem in South Korea, two studies with young adult samples have investigated associations between the five dimensions of personal identity development with indicators of psychological adjustment (Y. Park et al., 2023, 2024). In cross-sectional correlation analyses in both studies, adaptive personal identity development processes (i.e., exploration in breadth, exploration in depth, commitment making, and identification with commitment) were positively associated with psychological well-being and negatively with depressive symptoms, whereas ruminative exploration showed the opposite pattern. One of these studies utilized CLPMs to examine the interrelations before and after a social crisis (the social consequences of COVID-19; Y. Park et al., 2024). It was found that, prior to COVID-19, higher psychological well-being predicted more active engagement in exploration in breadth, exploration in depth, commitment making, and identification with commitment, but the opposite directional effects were not significant, a pattern observed among Belgian high school students. This unidirectional pattern was interpreted as suggesting that, while Korean young adults may benefit from psychological adjustment to engage in adaptive personal identity processes, their sense of personal identity may not yet be sufficiently consolidated to directly strengthen their psychological adjustment. Their study, thus, provides further evidence for the potential late onset of personal identity development among South Korean youth.

Demographic Variables as Covariates

Previous research has shown that both self-esteem and identity are significantly associated with demographic variables. Meta-analyses have found that self-esteem is related to gender (Zeigler-Hill & Myers, 2012), age (Orth et al., 2018), and socioeconomic status (Twenge & Campbell, 2002). Likewise, identity has been linked to gender (Verschuere et al., 2017), age (Kroger et al., 2010), and socioeconomic status (Kukkola et al., 2023). Accordingly, these demographic variables were included as covariates in the main analyses.

The Current Study

Personal identity development and self-esteem may influence each other reciprocally, yet the majority of empirical work has emphasized self-esteem primarily as an outcome of identity development in cross-sectional analyses. Longitudinal evidence is scarce, and the one study that directly tested these relations was limited to a Belgian youth study using cross-lagged panel models. The current study addressed this gap by following a cohort of South Korean college freshmen across their first academic year. Using four waves of data, this study investigated the bidirectional relations between the five dimensions of personal identity development and self-esteem. Specifically, a random intercept cross-lagged panel model was used to focus on whether within-person changes in identity development processes precede or follow within-person changes in self-esteem. Because it is unclear how active or advanced personal identity development is among Korean college freshmen, specific hypotheses about which paths would be statistically significant were not made. However, based on prior theoretical and empirical work, it was expected that if significant paths were observed, commitment making and identification with commitment would be positively associated with self-esteem, whereas ruminative exploration would be negatively associated with self-esteem. For exploration in breadth and exploration in depth, expectations remained open given mixed findings.

Method

Participants and Procedure

Participants were first-year undergraduate students at a private university in an eastern coastal city of South Korea. They were recruited from an introductory psychology course offered in five sections. As this course was a mandatory general education requirement for all first-year students, the sample included students from diverse academic majors, ensuring representation across different fields of study. Data were collected longitudinally across four waves at three-month intervals, beginning in March 2024, which marked the students' first month of college. At Time 1 (March 2024), 867 students initially participated, with 782 students passing attention checks and providing complete data on age, gender, socioeconomic status (SES), identity, and self-esteem measures. At Time 2 (June 2024), 718 of 766 participants passed attention checks, followed by 691 of 731 participants at Time 3 (September 2024), and 641 of 685 participants at Time 4 (December 2024). Students received course credit for voluntary participation, with

alternative assignments offered to those who chose not to participate. For the present analyses, only participants who completed the relevant questionnaires, passed all attention checks, and participated in at least two waves were included, resulting in a final analytic sample of 641 participants (48% women, 52% men; $M_{age} = 19.13$, $SD_{age} = 1.49$). As this project addressed multiple research questions, a formal power analysis was not conducted; instead, efforts were made to recruit as many first-year students as possible. This study was approved by the Institutional Review Board.

Measures

Personal Identity Development Processes

Participants' engagement in personal identity development processes was measured using the Dimensions of Identity Development Scale developed by Luyckx et al. (2008) and translated into Korean by Y. Park et al. (2023). The scale consists of five subscales: exploration in breadth, exploration in depth, commitment making, identification with commitment, and ruminative exploration, with each subscale comprising five items. Example items include: "I think about different things I might do in the future" (exploration in breadth), "I think about whether the aims I already have for life really suit me" (exploration in depth), "I have decided on the direction I am going to follow in my life" (commitment making), "I sense that the direction I want to take in my life will really suit me" (identification with commitment), and "I keep wondering which direction my life has to take" (ruminative exploration). Each item was rated on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), with higher scores indicating higher levels of the respective identity dimension. Internal consistency reliability (McDonald's ω) at Time 1 (T1) for exploration in breadth, exploration in depth, commitment making, identification with commitment, and ruminative exploration were 0.84, 0.64, 0.88, 0.85, and 0.80, respectively; at Time 2 (T2): 0.84, 0.68, 0.90, 0.89, and 0.82; at Time 3 (T3): 0.84, 0.69, 0.91, 0.87, and 0.82; and at Time 4 (T4): 0.87, 0.73, 0.91, 0.89, and 0.76.

Self-Esteem

Participants' self-esteem was measured using the Korean version of the Rosenberg Self-Esteem Scale (Rosenberg, 1965) translated by Moon et al. (2025). The scale consists of 10 items that assess individuals' overall self-worth. An example item is "I feel that I am a person of worth, at least on an equal basis with others." Participants responded on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*), with higher scores indicating higher self-esteem.

Internal consistency reliability (McDonald's ω) at T1, T2, T3, and T4 were 0.91, 0.93, 0.93, and 0.92, respectively.

Socioeconomic Status

Socioeconomic status was assessed using 10 vertically arranged boxes. The lowest box represented the bottom 10% of the socioeconomic distribution, and each subsequent box indicated a 10% increase, with the top box representing the top 10%. Participants selected the box that best represented their own socioeconomic position. For analysis, responses were recoded to range from 10 (*bottom 10%*) to 100 (*top 10%*).

Data Analysis

Preliminary analyses were conducted using SPSS v. 29 (IBM Corp, 2022). Specifically, the distribution and bivariate correlations of the study variables were examined. Intraclass correlation coefficients for each study variable were also examined to determine the proportion of variance across time that could be attributed to between- and within-person differences, which would provide insight on the usefulness of the main analysis that is explained below. Then, missing data were examined to determine whether they were missing at completely random (MCAR) using Little's MCAR test (Little, 1988). Given the sensitivity of this test to large sample sizes, chi-square to degrees of freedom ratio were examined along with the significance of the test.

Main analyses were conducted using a series of random intercept cross-lagged panel models (RI-CLPM; Hamaker et al., 2015) in Mplus v. 8.9 (Muthén & Muthén, 1998–2017). The RI-CLPM is an extension of the traditionally popular cross-lagged panel model (CLPM). Whereas the CLPM examines stability in a construct across time (autoregressive paths) and directional associations between different constructs over time (cross-lagged paths), it does not distinguish between stable between-person differences and dynamic within-person fluctuations. The RI-CLPM addresses this limitation by decomposing variance into time-invariant between-person factors and time-varying within-person factors. To elaborate, in the RI-CLPM, a random intercept is included to capture each individual's overall average level on a variable across time, thereby separating stable between-person differences from within-person variability. Autoregressive paths in the RI-CLPM, then, indicate whether increases or decreases in one variable relative to a person's typical level carry over to the next time point. The cross-lagged paths in the RI-CLPM indicate how increases or decreases in one variable relative to a person's typical level predict subsequent deviations in another variable and vice versa.

Table 1 Descriptive statistics and correlations between study variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. T1 - EB																										
2. T2 EB	0.58**																									
3. T3 EB	0.59**	0.65**																								
4. T4 EB	0.54**	0.64**	0.65**																							
5. T1 ED	0.54**	0.38**	0.41**	0.38**																						
6. T2 ED	0.48**	0.66**	0.48**	0.43**	0.57**																					
7. T3 ED	0.37**	0.42**	0.58**	0.47**	0.58**	0.56**																				
8. T4 ED	0.38**	0.49**	0.50**	0.69**	0.52**	0.62**	0.68**																			
9. T1 CM	0.38**	0.35**	0.39**	0.38**	0.42**	0.43**	0.44**	0.46**																		
10. T2 CM	0.30**	0.46**	0.41**	0.37**	0.29**	0.55**	0.40**	0.48**	0.69**																	
11. T3 CM	0.30**	0.35**	0.49**	0.45**	0.37**	0.43**	0.54**	0.50**	0.72**	0.74**																
12. T4 CM	0.31**	0.33**	0.38**	0.53**	0.31**	0.41**	0.46**	0.63**	0.68**	0.70**	0.75**															
13. T1 IC	0.46**	0.42**	0.43**	0.41**	0.46**	0.44**	0.37**	0.44**	0.79**	0.63**	0.65**	0.65**														
14. T2 IC	0.34**	0.56**	0.46**	0.42**	0.27**	0.55**	0.38**	0.47**	0.58**	0.84**	0.64**	0.64**	0.67**													
15. T3 IC	0.31**	0.42**	0.60**	0.47**	0.30**	0.41**	0.52**	0.53**	0.59**	0.68**	0.79**	0.71**	0.67**	0.75**												
16. T4 IC	0.37**	0.43**	0.48**	0.60**	0.30**	0.44**	0.41**	0.64**	0.55**	0.67**	0.65**	0.82**	0.65**	0.73**	0.77**											
17. T1 RE	-0.11**	-0.17**	-0.18**	-0.20**	-0.09*	-0.14**	-0.15**	-0.22**	-0.66**	-0.53**	-0.51**	-0.51**	-0.57**	-0.47**	-0.46**	-0.42**										
18. T2 RE	-0.14**	-0.24**	-0.24**	-0.16**	-0.09*	-0.25**	-0.19**	-0.23**	-0.54**	-0.68**	-0.56**	-0.52**	-0.48**	-0.60**	-0.53**	-0.50**	0.68**									
19. T3 RE	-0.10*	-0.17**	-0.25**	-0.27**	-0.12*	-0.19**	-0.20**	-0.29**	-0.50**	-0.55**	-0.64**	-0.55**	-0.50**	-0.48**	-0.57**	-0.53**	0.59**	0.66**								
20. T4 RE	-0.05	-0.13*	-0.22**	-0.19**	-0.07	-0.19**	-0.21**	-0.26**	-0.52**	-0.53**	-0.60**	-0.64**	-0.50**	-0.48**	-0.58**	-0.55**	0.59**	0.67**	0.71**							
21. T1 SE	0.30**	0.32**	0.38**	0.32**	0.14**	0.20**	0.16**	0.21**	0.38**	0.39**	0.39**	0.34**	0.48**	0.45**	0.45**	0.41**	-0.43**	-0.42**	-0.39**	-0.37**						
22. T2 SE	0.27**	0.41**	0.40**	0.35**	0.12**	0.26**	0.16**	0.26**	0.33**	0.47**	0.42**	0.37**	0.41**	0.54**	0.52**	0.46**	-0.39**	-0.51**	-0.47**	-0.43**	0.76**					
23. T3 SE	0.23**	0.33**	0.46**	0.44**	0.11*	0.21**	0.25**	0.32**	0.33**	0.39**	0.44**	0.43**	0.42**	0.46**	0.55**	0.52**	-0.37**	-0.42**	-0.49**	-0.48**	0.74**	0.80**				
24. T4 SE	0.28**	0.36**	0.44**	0.49**	0.16**	0.24**	0.26**	0.38**	0.33**	0.36**	0.45**	0.49**	0.46**	0.50**	0.56**	0.55**	-0.34**	-0.39**	-0.46**	-0.49**	0.74**	0.79**	0.85**			
25. Age	0.15**	0.10*	0.02	0.05	0.13**	0.16**	-0.06	0.03	0.14**	0.16**	0.02	0.03	0.15**	0.14**	0.03	0.08	-0.04	-0.08	-0.01	0.02	0.11**	0.07	0.03	-0.00		

Table 1 (continued)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
SES	26.	0.10**	0.07	0.07	0.06	0.06	0.10*	0.05	0.10	0.13**	0.13**	0.06	0.08	0.11**	0.08	0.09	0.10*	-0.14**	-0.11**	-0.10	-0.02	0.14**	0.16**	0.13*	0.13*	0.04	
Gender	27.	-0.02	-0.04	-0.05	-0.07	0.05	-0.03	0.07	-0.01	-0.09*	-0.14**	-0.09	-0.14**	-0.18**	-0.18**	-0.16**	-0.18**	0.03	0.06	0.08	0.11*	-0.07	-0.12**	-0.12*	-0.09	-0.17**	-0.05
M	3.71	3.82	3.75	3.81	3.55	3.63	3.62	3.69	3.39	3.47	3.50	3.59	3.46	3.54	3.49	3.55	3.10	3.02	3.02	2.98	3.76	3.82	3.84	3.80	19.13	58.33	
(SD)	(0.67)	(0.63)	(0.62)	(0.64)	(0.63)	(0.62)	(0.61)	(0.62)	(0.83)	(0.84)	(0.83)	(0.80)	(0.73)	(0.78)	(0.76)	(0.78)	(0.86)	(0.89)	(0.85)	(0.81)	(0.73)	(0.73)	(0.73)	(0.71)	(1.49)	(17.62)	

Note. EB = Exploration in breadth; ED = Exploration in depth; CM = Commitment making; IC = Identification with commitment; RE = Ruminative exploration; SE = Self-esteem; SES = Socioeconomic Status; Gender (1 = Men, 2 = Women)

* $p < .05$. ** $p < .01$

Note. EB = Exploration in breadth; ED = Exploration in depth; IC = Identification with commitment; RE = Ruminative exploration; SE = Self-esteem; SES = Socioeconomic Status; Gender (1 = Men, 2 = Women)

* $p < .05$. ** $p < .01$

Five RI-CLPMs were conducted in this study, for each pair between the five personal identity development process dimensions (i.e., exploration in breadth, exploration in depth, commitment making, identification with commitment, and ruminative exploration) and self-esteem. RI-CLPMs began with unconstrained models that freely estimated autoregressive and cross-lagged path coefficients. Gender, age, and SES were included as predictors of the random intercepts of self-esteem and personal identity development processes. Model fit was evaluated using the chi-square test, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Following conventional guidelines, CFI and TLI values ≥ 0.90 and RMSEA and SRMR values ≤ 0.08 were considered to indicate acceptable fit. CFI and TLI values ≥ 0.95 and RMSEA and SRMR values ≤ 0.05 were considered to indicate excellent fit (Hu & Bentler, 1999; Kline, 2015).

Then, to evaluate time-equivalence of the autoregressive and cross-lagged paths, constrained models were fitted to the data in which structural paths were set to be equal across time points. To examine whether the time-equivalence constraints could be sustained, model fit comparisons were made between the constrained and unconstrained models. The Satorra-Bentler chi-square difference test was performed, and changes in CFI, TLI, RMSEA, and SRMR indices were assessed (Cheung & Rensvold, 2002; Satorra & Bentler, 2001).

As supplementary analyses, traditional CLPMs were also conducted to allow comparison with the results of Luyckx, Klimstra, Duriez, et al. (2013). However, given the methodological inability of CLPMs to distinguish within-person from between-person effects, these results are not reported in the main text but are provided in the online supplementary materials.

Results

Preliminary Analysis

Descriptive statistics and correlation results for personal identity development processes and self-esteem at each time point are presented in Table 1. Self-esteem was positively correlated with exploration in breadth, exploration in depth, commitment making, and identification with commitment, but negatively correlated with ruminative exploration. All within-variable correlations across time points were positive and demonstrated high correlation coefficients. These high cross-time correlations suggest strong temporal stability for both identity and self-esteem.

This stability can be interpreted as reflecting the trait-like properties of identity and self-esteem. However, stability does not necessarily indicate an absence of dynamism (Lucas, 2023). Intraclass correlation coefficient (ICC) analyses support this interpretation. ICC results for identity and self-esteem revealed substantial between-person differences: exploration in breadth 0.59, exploration in depth 0.59, commitment making 0.70, identification with commitment 0.69, ruminative exploration 0.67, and self-esteem 0.77 (Shrout & Fleiss, 1979). This indicates that approximately 59–70% of the total variance in identity and 77% of the total variance in self-esteem stemmed from stable between-person differences, while simultaneously 23–41% of the variance was attributable to within-person change. These findings suggest that identity development processes and self-esteem possess both stable trait-like characteristics and dynamic properties at the within-person level. Therefore, the RI-CLPM, which can control for stable between-person differences and examine within-person changes, was used.

Little's Missing Completely at Random (MCAR) test was significant, $\chi^2(4518)=4685.50$, $p=.040$. This result suggests that the data are likely not MCAR. However, given that chi-square-based MCAR tests are sensitive to large sample sizes, the chi-square to degrees of freedom ratio was also examined. The ratio was $\chi^2/df=1.04$, which fell below the commonly accepted threshold of 2.0 (Kline, 2015), indicating that although the MCAR test result was significant, the practical deviation from MCAR was minimal. As a more conservative approach, the plausibility of the Missing at Random (MAR) assumption was investigated. Logistic regression analyses were conducted with missingness status as the outcome variable and baseline demographic characteristics as predictors. These analyses revealed that age and gender were significant predictors of missingness ($ps<0.05$), whereas SES was not ($p>.05$). These findings collectively suggest that the missingness mechanism is most consistent with MAR. Therefore, to obtain unbiased parameter estimates under the MAR assumption, the Full

Information Maximum Likelihood method was employed for all subsequent analyses. Furthermore, analyses were conducted using the Maximum Likelihood Robust estimation, which provides robust estimates regardless of the potential non-normality of the data.

Random Intercept Cross-Lagged Panel Model

Model fit indices of the unconstrained and constrained RI-CLPMs are presented in Table 2. In all of the unconstrained models, CFI and the TLI were above 0.95, and the SRMR and the RMSEA were below 0.06, indicating good fit. When comparing the unconstrained models with the constrained models, the Satorra-Bentler chi-square difference tests were statistically significant in all models. Moreover, changes in fit indices (TLI in all cases, RMSEA in most cases, and in some cases CFI and SRMR) exceeded established thresholds, indicating substantial differences between the models (Cheung & Rensvold, 2002). Therefore, the unconstrained RI-CLPMs were retained as final models, where the autoregressive and cross-lagged paths were allowed to vary over time.

All path coefficients between identity development processes and self-esteem are presented in Table 3, and statistically significant cross-lagged paths are illustrated in Fig. 1. Autoregressive paths of self-esteem were significant between T3 and T4 in all models. Autoregressive paths of the identity development processes were not significant at most time points, with the exceptions of identification with commitment between T3 and T4, and ruminative exploration between T1 and T2.

Regarding cross-lagged paths from self-esteem to the personal identity development processes, none were significant between T1 and T2. Between T2 and T3, there was a significant positive cross-lagged path from self-esteem to exploration in breadth. Between T3 and T4, more significant cross-lagged paths emerged, with self-esteem positively predicting exploration in breadth, exploration in

Table 2 Model comparison fit indices and invariance test

Model		χ^2	df	CFI	TLI	RMSEA	SRMR	$\Delta S-B \chi^2$	p
EB	Unconstrained Model	28.797	27	0.999	0.998	0.010	0.029	61.73	<0.001
	Constrained Model	99.364	47	0.974	0.972	0.042	0.047		
ED	Unconstrained Model	37.457	27	0.995	0.990	0.025	0.038	81.22	<0.001
	Constrained Model	125.407	47	0.961	0.956	0.051	0.051		
CM	Unconstrained Model	36.077	27	0.996	0.993	0.023	0.034	73.84	<0.001
	Constrained Model	120.285	47	0.969	0.966	0.049	0.055		
IC	Unconstrained Model	30.713	27	0.998	0.997	0.015	0.027	64.63	<0.001
	Constrained Model	101.215	47	0.978	0.976	0.042	0.052		
RE	Unconstrained Model	35.391	27	0.996	0.993	0.022	0.029	44.77	0.001
	Constrained Model	84.524	47	0.984	0.982	0.035	0.048		

Note. EB=Exploration in breadth; ED=Exploration in depth; CM=Commitment making; IC=Identification with commitment; RE=Ruminative exploration; SE=Self-esteem

Table 3 Standardized Path Coefficients from the RI-CLPM

Model Variables	Autoregressive paths				Cross-lagged paths								Correlation				Random Intercept
	Identity				SE				Identity → SE				SE → Identity				
	T1-T2	T2-T3	T3-T4	T1-T2	T2-T3	T3-T4	T1-T2	T2-T3	T3-T4	T1-T2	T2-T3	T3-T4	T1	T2	T3	T4	
EB - SE	0.07	-0.03	-0.14	0.13	0.21	0.33**	0.00	0.06	0.14	-0.07	0.24*	0.48***	0.02	0.27**	0.40***	0.46***	0.48***
ED - SE	-0.08	-0.11	0.16	0.09	0.19	0.35***	-0.13	0.12	0.12	-0.08	0.08	0.28**	-0.12	0.14	0.31**	0.41***	0.29***
CM - SE	0.05	0.07	0.08	0.09	0.17	0.34**	-0.03	0.10	0.18	-0.03	0.12	0.26**	0.09	0.34***	0.25*	0.46***	0.48***
IC - SE	-0.01	0.17	0.25**	0.13	0.22	0.32***	-0.07	0.03	0.20*	0.02	0.16	0.25**	0.13	0.36***	0.32***	0.28***	0.60***
RE - SE	0.17*	0.08	0.11	0.11	0.16	0.34***	-0.02	-0.07	-0.09	-0.11	-0.12	-0.26*	-0.22**	-0.42***	-0.31***	-0.31***	-0.52***

Note. EB=Exploration in breadth; ED=Exploration in depth; CM=Commitment making; IC=Identification with commitment; RE=Ruminative exploration; SE=Self-esteem.* $p<.05$.

Note. EB=Exploration in breadth; ED=Exploration in depth; CM=Commitment making; IC=Identification with commitment; RE=Ruminative exploration; SE=Self-esteem.* $p < .05$. ** $p < .01$. *** $p < .001$.

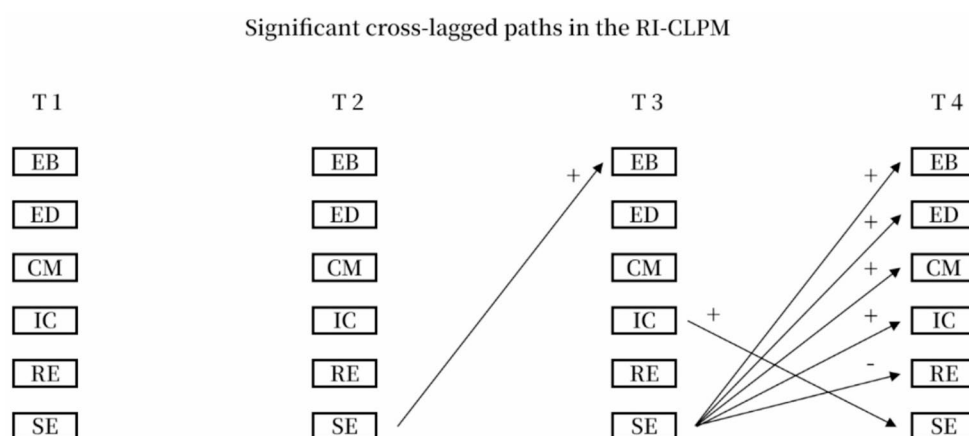
depth, commitment making and identification with commitment, and negatively predicting ruminative exploration, all with strong effect sizes (Orth et al., 2024). In reverse, from the personal identity development processes to self-esteem, only identification with commitment at T3 positively predicted self-esteem at T4 with a strong effect size.

Discussion

As part of the broader self-system, personal identity development and self-esteem may reciprocally impact each other as young people transition to adulthood. However, the field has predominantly focused on self-esteem as an outcome of personal identity development, leaving the bidirectional relation underexamined. Only one study has been conducted to date in Belgium (Luyckx, Klimstra, Duriez, et al., 2013), and it has not yet been replicated elsewhere. Thus, to further advance the understanding of the interrelation between personal identity development and self-esteem, the current study investigated whether changes in engagement in personal identity development processes predicted and were predicted by changes in self-esteem among South Korean college students across their first academic year. South Korean college students are particularly situated in a social context that enforces a single goal of academic achievement and college admission for all youth. The findings showed temporal stability and dynamic within-person fluctuations in personal identity development and self-esteem. Results also revealed shifting patterns of interrelations that potentially reflect the changing centrality of the task of identity development upon entering college.

Before discussing the dynamic interplay between identity and self-esteem, it is important to address the notable temporal stability observed in the data and its implications for understanding developmental processes. Consistent with previous longitudinal research (Y. Park et al., 2024; Shi et al., 2025), the cross-time correlations for both identity and self-esteem were relatively high. This stability reflects the inherently stable characteristics of these constructs rather than being merely an artifact of the three-month measurement intervals employed in the current study (Donnellan et al., 2012; Jansen et al., 2020). The observed stability is developmentally expected. During early adulthood, self-concepts become increasingly cohesive, enabling individuals to maintain consistent baseline levels of self-esteem and identity processes. This between-person stability indicates that individuals tend to maintain their relative standing compared to peers over time. However, this stability does not preclude the presence of significant within-person change, which is the focus of the current investigation. ICC analyses revealed that 23–41% of the total variance was attributable

Fig. 1 Significant Paths from the RI-CLPMs Note. EB=Exploration in breadth; ED=Exploration in depth; CM=Commitment making; IC=Identification with commitment; RE=Ruminative exploration; SE=Self-esteem. Only significant cross-lagged paths are displayed; autoregressive and contemporaneous correlation paths are not shown



to within-person fluctuations. This substantial portion of variance provides strong empirical evidence that these constructs were sufficiently dynamic (Lucas, 2023). These results suggest that identity development and self-esteem during early adulthood show trait-like stability while also displaying state-like fluctuations, implying that early adulthood represents a distinctive developmental period where core self-concepts are maintained while remaining responsive to developmental tasks and contextual experiences.

There were several indicators in the RI-CLPMs that there were considerable fluctuations of personal identity development and self-esteem in the current sample. One such indicator was the autoregressive paths. In the RI-CLPMs, autoregressive paths of self-esteem were not significant except for between T3 and T4. Autoregressive paths of the identity processes were also not significant at most time points, except for the positive paths in ruminative exploration between T1 and T2 and in identification with commitment between T3 and T4. Non-significant autoregressive paths indicate that deviations from an individual's average on a variable were not maintained and were rather episodic events than persistent carry-over. Significant positive autoregressive paths, on the other hand, signify that deviations tended to be maintained across waves. The within-person non-persistence in the first two intervals of the study contrasts with between-person stability that was demonstrated in the significant positive correlations within each variable across all waves in the preliminary analyses. That is, although individuals who exhibited higher or lower levels of personal identity development and self-esteem compared to others tended to maintain their relative standing (between-person stability), within-person levels tended to fluctuate rather than remain elevated or lowered until the next wave.

Closer scrutiny of each of the variables provides implications for the changing self-system in the first year of college. Specifically, the change in exploration in breadth, exploration in depth, and commitment making at one time point was

not sustained at the next, whereas identification with commitment and self-esteem persisted between T3 and T4. Out of the five personal identity development processes, identification with commitment is conceptually the final stage that involves a sense of stability and certainty of the self. That this process in particular was significant in the last interval suggests that such a sense about who one is and what one wants to do may be stably formed after individuals have had considerable time to adjust to the transition to college. On the other hand, ruminative exploration was found to be significant only between T1 and T2, potentially suggesting that entering with maladaptive engagement in personal identity development leads to difficulty in productively advancing one's personal identity, at least during the most intense transition in the first semester.

The general non-persistence of engagement in personal identity development processes may also have implications for understanding the temporality of these processes. The vast majority of personal identity development research has been conducted with one-year intervals, leaving much underexplored regarding how personal identity may change in shorter periods of time (Klimstra & Schwab, 2021). The examination of stability (or lack thereof) of the five identity development processes across three-month intervals suggests that the experiences and self-reflections that shape personal identity during this formative period may be more short-lived than previously assumed. More thorough research is required to further understand short-term trends of personal identity development engagement and their relation to existing long-term research.

In addition, the results of the current study indicate that the cross-lagged paths were inconsistent, and the worsening fit of the constrained RI-CLPM suggests that these paths exhibited time non-invariance. This lack of time-invariance implies that associations between the personal identity development processes and self-esteem may shift every three months at least during the first year of college. As mentioned earlier, Korean adolescents spend several years

preparing for college admission, a major life goal. While they may experience the joy of success upon entry, they soon realize that they must make important life decisions on their own, initiating the process of identity development. Therefore, such three-month time non-invariance may not be observed among upper-year students. Future research is needed to directly compare first-year and upper-year students to determine whether these patterns are observed across different stages of college.

Considering the paths from self-esteem to the identity development processes, the valences of the cross-lagged paths supported the hypotheses that there would be positive associations between self-esteem and commitment making and identification with commitment, and negative associations between self-esteem and ruminative exploration. This expectation was based on the premise that self-esteem can lead individuals to confidently initiate processes for forming and strengthening new personal identity commitments (Baumeister et al., 2003). Commitment making and identification with commitment, which reflect such progress, increased as a result of higher self-esteem, whereas ruminative exploration, which reflects the opposite of such progress, decreased. These results echo those of the Belgian longitudinal study (Luyckx, Klimstra, Duriez, et al., 2013), in which self-esteem positively predicted subsequent commitment processes, providing further evidence for the role of self-esteem in facilitating personal identity development during emerging adulthood.

The direction in which self-esteem predicts exploration in breadth and exploration in depth was not hypothesized because these processes are conceptually neutral with respect to whether they lead to making and identifying with commitments (Luyckx et al., 2006). Empirical findings have been mixed, with some studies reporting positive associations (e.g., Nakama et al., 2015) and others reporting negative associations (e.g., Luyckx, Klimstra, Schwartz, & Duriez, 2013). In the current study, both exploration in breadth and exploration in depth were positively predicted by self-esteem when the cross-lagged paths were significant. Notably, previous research showing positive associations was conducted with Japanese participants (Nakama et al., 2015). Considering that the current sample consisted of Korean participants, these results suggest that the relationship may vary among East Asian populations. Holistic and dialectical thinking, which characterizes East Asian cognitive styles, tolerates contradiction and paradox, potentially enabling individuals to perceive the search for personal identity commitments (i.e., exploration in breadth and exploration in depth) and the presence of such commitments (i.e., commitment making and identification with commitment) as inherently interconnected and mutually reinforcing (Nisbett et al., 2001). Thus, among East Asians,

exploration is not necessarily indicative of a lack of commitment, and both exploration and commitment processes may be positively associated with self-esteem. Nonetheless, further research is needed to clarify these relationships and to determine whether the observed patterns generalize across different East Asian populations.

The timing of significant cross-lagged paths illustrates a gradation of increasing personal identity development activity. Between T1 and T2, self-esteem did not predict any of the personal identity process dimensions. Between T2 and T3, self-esteem positively predicted exploration in breadth, and between T3 and T4, self-esteem positively predicted exploration in breadth, exploration in depth, commitment making, and identification with commitment and negatively predicted ruminative exploration. This gradation may reflect South Korean college freshmen's competing desire to be free from concerns about their future while simultaneously needing to establish new personal goals and values as they navigate the transition to adulthood. The three-month intervals in this study, which correspond to the beginning and end of the first two semesters, support this interpretation.

Specifically, during the first semester, changes in self-esteem did not predict changes in engagement in any of the identity processes. This finding may indicate a low overall interest in identity development among first-semester college students, potentially attributable to a desire to be care-free following years of preparing for college admissions. During the first summer break, a positive cross-lagged path emerged between self-esteem and exploration in breadth, conceptually the first step of the five identity development processes in the dual-cycle model (Luyckx et al., 2008). The emergence of this significant path may reflect the initiation of personal identity development as students recognize the need to make identity-related choices. Higher self-esteem may facilitate the initiation of exploration in breadth, although students may not yet be prepared to make commitments or engage in further evaluation. By the second semester, higher self-esteem predicts more engagement across all personal identity development processes, suggesting that the full cycles of personal identity development are now active.

Considering the paths from the personal identity development processes to self-esteem, only one cross-lagged path was significant, from T3 to T4, where higher identification with commitment predicted higher self-esteem. All other cross-lagged paths were not significant. The theoretical rationale that personal identity development can predict later self-esteem is based on the assumption that a consolidated, achieved personal identity functions as a self-dependent anchor in navigating life (Erikson, 1968), which in turn provides a basis for positive self-evaluation (i.e., high self-esteem). Longitudinal research with Belgian youth

showed that identification with commitment predicted self-esteem among college students but not high school students. One potential explanation is that college students, having engaged in personal identity development for longer and possessing more mature cognitive abilities, may have better-consolidated identity commitments than high school students. Additionally, college students encounter relatively more important life decisions with less structure than high school students, making personal identity development a more relevant resource for navigating these decisions. Applying these contextual factors to the current study, the significant cross-lagged path from identification with commitment emerging in the second semester suggests that South Korean college students' personal identities become sufficiently consolidated to serve as a foundation for self-esteem beginning at this stage.

In sum, the temporal changes in personal identity development processes and their relations with self-esteem illustrate the dynamic nature of the first college year for Korean students. At the start of college, students may exhibit limited interest in engaging with their personal identities due to fatigue from the intense preparation associated with college admission. Consequently, their engagement in personal identity development processes was unstable and had minimal reciprocal influence on self-esteem. During the first summer break, students may begin attending to personal identity development, as reflected in the activation of exploration in breadth, which is predicted by higher self-esteem. However, the other identity processes are not yet active enough to rely on self-esteem as a resource. By the second semester, higher self-esteem promotes more engagement across all identity development processes, and notably, higher identification with commitment begins to foster self-esteem.

The current study contributes to existing youth identity development literature in two ways. First, these findings conform with previous research in South Korea that asserted that personal identity development is delayed among South Korean youth due to the hypercompetitive education system leading up to college admissions (Y. Park et al., 2023, 2024). Examination of personal identity statuses among young adults revealed 70% of young adults to still be in active exploration of their identities, and their personal identity development were found not to be mature enough to positively influence their psychosocial adjustment. The current study adds to the narrative, providing insight into how emerging adults, particularly transitioning to college, deal with the developmental task of personal identity following such a delay.

Second, the findings of this study offer a fresh perspective on the theoretical relationship between personal identity and self-esteem. To date, most psychological research has focused on how identity affects self-esteem, with both

experimental (e.g., Moon et al., 2025) and cross-sectional (e.g., Ryeng et al., 2013) studies typically treating self-esteem as the dependent or outcome variable. Yet, recent meta-analytic evidence suggests that self-esteem exerts positive causal effects across various life domains, including social relationships, academic performance, and career success (Orth & Robins, 2022). These findings indicate that self-esteem is a vital psychological resource that not only helps individuals cope with life's challenges but also motivates them to pursue personal growth and new opportunities. Moreover, the fact that self-esteem development temporally precedes identity formation (Meeus, 2016; Orth et al., 2018) points to its foundational role in shaping identity. Accordingly, researchers are encouraged to examine how self-esteem facilitates identity development over time.

Despite these contributions, the current study is not without limitations. First, the theorized mechanisms underlying the relationship between identity and self-esteem were not directly examined. For instance, increased agency (S. W. Park et al., 2023) may mediate the link between identity development and self-esteem over time. Second, because the sample in this study consisted of college students, it remains unclear whether the present findings can be generalized to young adults who enter the workforce directly after high school. For example, in a longitudinal study of vocational high school students in Japan, those who identified more strongly with their curricula reported a clearer sense of self one year later (Sugimura et al., 2025). Assuming they obtained the jobs they had prepared for during high school, these individuals may be more likely to identify with their commitments—thereby fostering higher self-esteem—compared to college freshmen who are only beginning to explore their identities. Third, inferences were made in respect to the impact of the broader culture of South Korea which excessively values college admissions during adolescence, but such cultural forces were not directly accounted for. Future research may directly assess young people's experience within the academic system to investigate how such a culture shapes the process of personal identity development in South Korea.

Finally, it should be noted that the internal consistency of exploration in depth in this study was somewhat lower than in previous research (e.g., Y. Park et al., 2024). One possible explanation, particularly in the context of the first-year Korean college student sample, lies in the nature of the items of exploration in depth. These items, as well as the items of identification with commitment, presuppose the existence of prior identity commitments (e.g., "I think about whether the aims I already have for life really suit me"). However, as mentioned earlier, most Korean college freshmen have not yet established clear commitments, which may have made it more difficult for them to respond to these items compared

to the exploration in breadth and commitment making items that do not require such assumptions. Indeed, McDonald's ω was consistently lower for exploration in depth and identification with commitment than for exploration in breadth and commitment making, respectively, across the four waves. Thus, the relatively low reliability of exploration in depth can reasonably be attributed to the interplay between the assumptions embedded in the items and the developmental stage of the present sample.

Conclusion

Personal identity development and self-esteem may be bidirectionally interrelated as central parts of the self-system of youth. However, there has been a prevailing tendency in the field to treat self-esteem only as an outcome of personal identity development. The current study addressed this gap by conducting RI-CLPMs between personal identity development processes and self-esteem among first-year college students in South Korea. The findings can be summarized in two key points. First, the longitudinal associations between identity development processes and self-esteem became apparent during the second semester of college, probably due to the delayed identity development among Korean youth. Second, self-esteem functions as a psychological resource that facilitates identity development; once individuals achieve a clear sense of identity, however, identity fosters self-esteem.

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Authors' Contributions KB conducted the formal data analysis and drafted the initial manuscript; YP revised the initial manuscript and contributed to the interpretation of findings; HR contributed to the data analysis and reviewed the initial draft; JL was involved in the study design, collected data, and reviewed the initial manuscript; SP conceived the study, acquired the funding, and revised the manuscript. All authors read and approved the final manuscript.

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Data Availability The datasets generated and analyzed during the current study are available in the Open Science Forum repository, <https://osf.io/gx9jh/>.

Declarations

Conflicts of Interest The authors declare no competing interests.

Ethical Approval The Institutional Review Board of Catholic Kwandong University approved this research project. We followed the ethi-

cal standards outlined in the 1964 Declaration of Helsinki and its subsequent amendments.

Informed Consent All participants completed the questionnaires after providing informed consent.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process. During the preparation of this work, the authors used ChatGPT exclusively for the purpose of language editing and correcting grammar. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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